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CABOT, the name of two Venetians, father and son, both celebrated as navigators and discoverers.—GIOVANNI CABOT, or CABOTTO, the father whose business compelled him to reside much in Bristol, was appointed by Henry VII., March 5, 1496, to the command of a squadron of five vessels on a voyage of discovery in the Atlantic Ocean. In this expedition he was accompanied by his sons Ludovico, Sebastiano (born at Bristol, 1477) and Sanzio. On the 24th of June 1497, the coast of Labrador, North America, was sighted. The merit of this discovery has been generally ascribed to the navigator's second son, Sebastian C., the most scientific of the family; but an extract from a chart preserved by Hakluyt mentions the father before the son. The expedition returned in August 1497. In 1498, a second was made, with what results we do not know; and in 1499, a third to the Gulf of Mexico. About this time, Giovanni, the father, appears to have died, and we hear no more of *Sebastian* till 1512, when he entered the service of Ferdinand, king of Spain. During the year 1515, he was engaged in revising maps and charts, in connection with his profession, and in planning an exploration of the North-west Passage to Asia, which, however, was laid aside on account of the death of Ferdinand in 1516. C., who seems to have been no favourite with the Spanish courtiers, was now subjected to a series of contemptible insults. This usage induced him to return to England, and in 1517, he was appointed by Henry VIII. to the command of an expedition to Labrador. He reached lat. 67½° n., and entered Hudson's Bay, where he gave names to several places; but the expedition proved on the whole a failure, on account of the cowardice or malice of his vice-commandant, Sir Thomas Perte. C. now entered again into the Spanish service, was made pilot-major of the kingdom by Charles V., and commanded an expedition which examined the coast of Brazil and La Plata, which he attempted to colonise. In 1531, he returned to Spain, and resumed his old situation; but in 1548, he once more betook himself to England, where he was well received by King Edward VI., who made him Inspector of the Navy, and gave him a pension. To this monarch he seems to have explained the variation of the magnetic needle in several places, which he was among the first, if not the very first, to notice particularly. In 1553, C. was the prime mover and director of the expedition of Merchant Adventurers which opened to England an important commerce with Russia. It is not known exactly when C. died.—"Memoir of Sebastian Cabot" (Lond. 1831).

CABOTZ. See CUSSO.

CABRA (ancient *Æpabrum*), a town of Spain, in the province of Cordova, 30 miles south-east of the city of that name. C. is irregularly built between two hills, and surrounded with gardens; vineyards in the neighborhood produce excellent wine. It is chiefly agricultural; but it has manufactures of woollen, linen, hats, soap, earthenware, &c. Pop. 12,000.

CABRAL, or Cabrera, Pedro Alvarez, the discoverer of Brazil, was descended from an old and patrician Portuguese family. Nothing is known of his early life, save the fact, that he must have recommended himself by talent and enterprise to King Emanuel of Portugal, who, after the first voyage of Vasco de Gama, appointed C. to the command of a fleet of 13 vessels, carrying 1200 men, and bound for the East Indies. On the 9th March 1500, he sailed from Lisbon. To avoid the inconvenience of being becalmed on the coast of Africa, he took a course too far westerly, fell into the South American current of the Atlantic, and was carried to the unknown coast of Brazil, of which he claimed possession for the king of Portugal, April 24, 1500, naming the new country "Terra da Santa Cruz." After sending home one vessel to bear news of this great accidental discovery, C. sailed for India; but on the 29th of May, four of his vessels foundered, and all on board perished, including Diaz, the great navigator; and soon afterwards three more vessels were lost. C. therefore landed at Mozambique, on the east coast of Africa, of which he first gave clear information, and also discovered (August 23) the Antschedives Islands, of which he described correctly the position. Hence he sailed to *Calicut*, where, having made the terror of his arms felt, he was permitted to found a factory; entered into successful negotiations with native rulers, and thus established the first com-

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mercial treaty between Portugal and India. He returned from India, bringing with him a considerable booty, and arrived in the port of Lisbon, July 31, 1501. It appears probable that the king was dissatisfied with the results of the expedition (although it had annexed Brazil to the crown of Portugal), for subsequently we find no mention made of C. among other discoverers. At the request of C., Sancho de Toar wrote a description of the coast of Sofola. C.'s voyages are described in Ramusio's "Navigatione e Viaggi," 3 vols (Venice, 1563; new ed., Venice, 1885).

CABRE'RA, a small island in the Mediterranean, lying off the southern point of Majorca. It is about three miles in length and breadth, with an irregular coast, and is little else than a barren calcareous rock. The only interest attached to C. is, that during the war in the Peninsula it formed a Spanish depôt for French prisoners, who were crowded in thousands into the desolate spot, and treated with great barbarity; of which an account is given in a popular work, entitled the "Adventures of a French Sergeant."

CABRE'RA, Don Ramon, the boldest leader of the Carlist party in Spain, was born at Tortosa, in Catalonia, 31st August 1810. The death of Ferdinand, in 1833, gave the signal for civil war, and first brought C. into notice. Placing himself at the head of some guerilla troops, he joined the Absolutists, or partisans of Don Carlos, and by his vigilance, energy, and daring, soon rose to be second in command in the Maestrazgo district. Throughout Aragon and Valencia his name became a by-word for cruelty. After penetrating as far south as Andalusia, his forces were completely routed by the royal troops, on the borders of Aragon, and he himself, severely wounded, escaped with difficulty into the woods. It was now rumored that C. was dead, when all at once he reappeared at the head of 10,000 foot and 1600 horse. Invading the province of Valencia, he overthrew the royal army at Bufiol, 18th February 1837, and again on the 19th March at Burjasot; but was in turn vanquished at Torre Blanca, and once more compelled to seek a hiding-place. Shortly after, he reopened the war with fiery energy. Madrid itself was threatened by C., who, about this time, received the title of Count of Morella for his vigorous defence of the fortress of that name, and was also appointed governor-general of Aragon, Valencia, and Murcia. The Carlists now believed that the triumph of absolutism was approaching, when the treachery of the Carlist general, Marotto, changed the whole aspect of affairs, and Don Carlos fled from Spain. C. held out until Espartero forced him to quit the country in the summer of 1840. He then entered France, where he was taken prisoner, and confined for a short time in the fortress of Ham. In 1845, he strongly opposed Don Carlos's abdication of his rights. On the outbreak of the French revolution in 1848, he renewed the struggle on behalf of absolutism in Spain, but the adventure proved a miserable failure, and on the 17th January 1849, he recrossed the Pyrenees, to live in retirement. He afterwards married a wealthy English lady, Miss Marianne Catharine Richards. When Alphonso was proclaimed king of Spain in 1875, C. advised the Carlists to submit to him, chiefly on the ground that he was "a good son of the church."

CABU'L, a river in Afghanistan, rises in lat. 34° 21′ n., and long. 68° 20′ e., on the southern declivities of the Hindu Kush or Indian Caucasus. Its source is 8400 feet above the level of the sea; and an eastward run of 320 miles, with a fall of about 7500 feet, along North Afghanistan, through the Khyber Mountains, and across Peshawur, carries it into the Indus, opposite to Attock, in the Punjab. The point of confluence marks the head of navigation on the main stream, while the tributary itself is practicable about 50 miles upwards for craft of 40 or 50 tons. By means, therefore, of the two taken as one line, there exists an available communication of about 1000 m. between the Khyber Mountains and the Indian Ocean. The C. washes the cities of Cabul, Jelalabad, and Dobundee.

CABU'L is the name given to that part of Afghanistan (q. v.) which lies south of the Hindu Kush, and is drained by the Cabul river. It extends from the south of Ghiznee to the Hindu Kush, and from Bamian (q. v.) to the Khyber Pass. This region has long occupied a prominent position in the world. Through it, as the passage from Persia to India, Alexander the Great marched to complete his eastern conquests; from it issued Mahmoud of Ghiznee, the first Mohammedan invader of Hindustan.

The city of Cabul, from which the surrounding territory takes its name, has

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60,000 inhabitants, and stands in lat. 34° 30′ n., and long. 69° 6′ e., near the point where the river, here crossed by three bridges, ceases to be fordable. Elevated about 6400 feet, and overtopped, within a short distance to the north, by pinnacles of the Hindu Kush, about 14,000 feet higher than itself, C. has a severe winter, and a temperate summer, ranging from 75° to 85° F. The city was formerly surrounded with an earthen wall, which no longer exists. It is separated into different quarters, for defence, by stone walls—the Bala Hissar, or citadel proper, being on the e., and the Kuzzilbashes or Persians having a strongly fortified quarter on the s.w. In the days of Sultan Baber, C. was the capital of the Mogul empire. In more recent times, it has witnessed some of the most momentous events in Anglo-Indian history. In 1839, it was taken by the British: in 1841, it was lost through a treacherous outbreak, which led (6th January 1842) to the massacre of about 4000 soldiers and 12,000 followers; and, finally, after being recovered by General Pollock in the same year, it was abandoned, its bazaars and the public buildings having previously been burned to the ground.

After the death of Dost Mohammed, Ameer of Afghanistan, Shere Ali, the son whom he had selected as his heir, had to fight for the possession of C. with Uzful Khan, his elder brother, and the son of the latter, Abdulrahman, who had married a daughter of the Khan of Bokhara. Shere Ali was at first unsuccessful. On May 21, 1866, Uzful entered C. in triumph, and was proclaimed Ameer of Afghanistan. He applied to Sir John Lawrence, the Indian Viceroy, to recognise him, but the request was declined on the ground that Shere Ali remained in possession of a large part of Afghanistan. At the death of Uzful, his brother Azim took the title of Ameer, not of Afghanistan, but of C. and Candahar. Azim was not, however, allowed to preserve these possessions. In the end of 1868, Shere Ali, aided by his son Yakoob, obtained possession of C., which was then restored to its original and proper position of capital of Afghanistan (q. v.).

CACA'O. See COCOA.

CACCA'MO, a town in the province of Palermo, Sicily, about 6 miles south-west of Termini, with a population of 7200.

CA'CERES, a town of Spain, capital of the new province of Caceres, is situated on a river of the same name, about 25 miles west of Truxillo, in a rich agricultural district. It is famous for its bacon; has manufactures of linen, woollens, leather, hats, soap, &c.; dye-works and flour-mills, and a large trade in the produce of the district. It is the *Castra Cacilia* of the Romans, and many relics of its antiquity are still found. It is rich in architecture of the feudal period, and has one of the largest and finest bull-rings in Spain. Pop. 14,000.

CA'CERES, Nue'va, a town of the Philippines, in the province of South Camarines, on the island of Luzon. It is situated on the river Naga, or Santa Cruz, between the Bay of San Miguel and the Gulf of Ragay, about 175 miles south-east of Manila. Pop. 12,000.

CACHA'O, capital of the province of Tonquin, and the largest city of the kingdom of Anam (q. v.), having an estimated population of 100,000. It stands about 100 miles from the sea, on the Tonquin River, which is thus far navigable for small-craft. It has a considerable trade, sufficient to have at one time attracted English and Dutch factories. The exports are bullion, silks, and lackered ware: and the imports are pepper, arms, long cloths, chintzes, and manufactured goods generally. The port is open to all nations.

CACHA'R, or Hairu'mbo, a district of British India, since 1874 included in the chief-commissionership of Assam, between 24°—26° n. lat., and 92°—93° 30′ e. long. With an area of 1285 sq. m., it contained, in 1871, 205,027 inhabitants. It is mostly mountainous and uncultivated. Its principal river is the Barak, which, after a singularly tortuous course of 350 miles, enters the Brahmaputra about 40 miles above Dacca. The territory produces rice, cotton, tea, sugar, timber, bamboo, iron-ore, wax, and ivory; and imports salt, cloths, tobacco and ghee, or half-liquid butter.

CACHE (Fr. a lurking-hole), the name given by parties of travellers in the great western prairies of the United States to places for concealing provisions and other articles. Designing to return on their tracks after crossing the Rocky Mountains, they disburden themselves of what articles can be spared, and to conceal them from

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the Indians, construct places of deposit in the wilderness. The making of a C. is a matter of much labor and ingenuity. A hole is dug to a depth of perhaps six or eight feet and several feet broad, and then the articles being interred, the surface is replaced with the utmost possible care. The excavated earth is also carefully removed, so as to leave no trace whatever of the excavation. The situation of the C., however, is known to the party by some landmark, and returning months afterwards, they probably find its contents undisturbed.

CACHET, Lettres de. See LETTRES DE CACHET.

CACHE'XIA, a name applied by physicians sometimes to a group of diseases, and sometimes to the constitutional state accompanying a particular disease—e. g., Cancerous C., Gouty C., Mercurial Cachexia. The word is derived from the Greek *kakos*, bad, and *hexis*, a habit, and signifies simply *a bad habit of body*, without reference to the cause of illness. From Cullen's having in modern times given extensive circulation to the word, as indicating a large group of chronic diseases, in most of which there are complicated changes in the blood and in the solid textures, C. has come to be chiefly employed with reference to diseases in which the general nutrition of the body is at fault, and in which the local disorders are supposed to be the result of a constitutional cause. Thus, Cancerous C. indicates the peculiar impoverished state of the blood and general debility which are associated with the deposits of cancer in various parts of the body; Gouty C., the state of the general system in gout, as opposed to the mere local attack of gout in the foot, &c. The cachexiæ differ from the fevers in being much slower in development, and, for the most part, in having no natural termination at a fixed period. See CRISIS.

CA'CHOLONG, a beautiful mineral, regarded as a variety of Opal (q. v.). It is sometimes called Pearl Opal, or Mother-of-Pearl Opal. It is generally of a milk-white color, rarely with a yellowish or reddish tinge, opaque and dull or pearly and shining, and has a flat conchoidal fracture. Among the localities in which C. is found are the Giants' Causeway and the Faröe Islands.

CA'CHOLOT, Cachalot, Spermaceti Whale, or Sperm Whale (*Physeter macrocephalus* or *Catodon macrocephalus*), one of the largest of the *Cetacea* (q. v.), very peculiar in form and appearance, much sought after not only on account of the oil, but still more on account of the Spermaceti (q. v.) which it yields. Ambergris (q. v.), is also obtained from it. The C. belongs to the family of *Cetacea* called *Physeteridæ*, or *Catodontidæ*, of which some naturalists still think that there is only one well-ascertained species. There appears, however, to be pretty good reason for thinking that at least two species exist, both of which are occasional visitants of the British shores—the Common C., having no dorsal fin, and the High-finned C. (*Physeter Tursio*), having a very high dorsal fin. The Common C. has a very wide geographical range. It may almost be said to inhabit all seas, although it is most abundant in those of the southern hemisphere. It is not of frequent occurrence on the European shores, although it sometimes enters the Mediterranean, and is occasionally stranded on the coasts of Britain. An individual, fifty-four feet long and thirty in circumference, ran ashore on Cramond Island in the Firth of Forth in 1769, and was very particularly described in the Philosophical Transactions by Mr Robertson of Edinburgh. Twelve were caught at Walderwich, on the Suffolk coast, in 1783. The C. sometimes reaches the length of 70 or 80 feet. The head is enormously large, forming about one-half of the entire bulk of the animal, and occupying more than one-third of the entire length. From the head, the body tapers to the tail, and at last rather rapidly. The general color is very dark gray, nearly black on the upper parts, lighter beneath. Old males, or, in the language of the South Sea whalers, old bull-whales, usually have a large gray spot on the front of the head. The muzzle is very obtuse, almost as if suddenly cut off in front, the breadth of it almost equalling the thickness of the body. In a protuberance on the upper part of it, is the blow-hole, which is single, situated a little on the left side, and in form not unlike the letter S elongated. The mouth is very large and wide; and the throat, unlike that of the Greenland whale, is very wide, sufficiently so to admit the body of a man. The upper jaw projects some feet beyond the lower, and is destitute both of teeth and whalebone; the lower jaw has from 20 to 25 teeth on each side, according to the age of the animal. The teeth are conical and slightly recurved, projecting about two inches from the

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gum. The lower jaw is extremely narrow, the two branches being in contact throughout the greater part of its length: it fits into a groove in the upper, in which are cavities for the teeth. The eyes are small, and placed far back in the head, above the angles of the mouth; the left eye is said to be smaller than the right. Just above the eyes, the dorsal line rises considerably; the dorsal fin is also represented by a protuberance about half way between the neck and the tail; and these parts are seen above water in the ordinary swimming of the animal, which is at the rate of from 3 to 7 miles an hour, and just under the surface of the water, although when alarmed it swims with greater velocity, striking the water upward and downward with its tail with great force. The pectoral fins are small, and seem scarcely if at all to aid in progression, which is accomplished by the large and powerful tail-fin. The tail-fin is very broad, and is divided into two lobes, called by South Sea whalers *the flukes*.

The enormous head of the C. is in great part occupied by a cavity in front of and above the skull, called by whalers *the case*, which is a receptable for spermaceti (q. v.). This substance being light, it is not wonderful that the animal in swimming raises its head above the surface of the water, which it also often does even when at rest, "like a black rock in the ocean." The *case* frequently holds as much as ten large barrels of spermaceti. It is not formed of bone, but of a strong tendinous integument, and is divided into compartments communicating with each other. The substance which it contains is in a semi-fluid state, but hardens on cooling; it consists of spermaceti and oil; the oil is separated by draining and squeezing, and the spermaceti further purified, till, instead of being a yellow unctuous mass, in which state it is brought home by the whalers, it assumes a beautiful pearly white, flaky, almost crystalline appearance. When the spermaceti whale is killed, and towed alongside the whaling-ship, the *case* is emptied of its valuable contents through a hole made in front of the muzzle, and by means of a bucket attached to a pole. The spermaceti was at one time imagined to be the brain of the whale; what purpose it serves in the animal economy, is not well known, except that already alluded to of giving buoyancy to the forepart of the huge body; and perhaps this is its chief use, respiration even more than progression depending on it; but it is distinct enough from the brain, which is comparatively very small, and is indeed, as well as the skull which contains it, small in proportion to the whole bulk of the creature. Cavities filled with spermaceti are distributed over the body, and even ramify through the external fat or blubber, although the principle mass is in the head. The blubber of the C. is not nearly equal in thickness to that of the Greenland, whale, being only about fourteen inches thick on the breast of a large whale, and from eight to eleven inches on other parts of the body. It is called by whalers the *blanket*, is removed from the body of the captured whale in great strips, and is heated in large pots, the skin of the whale serving for fuel, when the oil known as SPERM OIL (q. v.) flows from it. The *junk*, a thick elastic mass, which occupies the forepart of the head, immediately under the *case*, yields also a considerable quantity of sperm oil.

The C. feeds upon fishes and cephalopodous mollusks. Squids and cuttle-fishes appear to be its chief food. It is gregarious in its habits, and the herds are called *schools* by whalers. Five hundred or more have been seen in a single herd. Large herds generally consist of females, with only a few males; herds of young males also occur; when solitary individuals are met with, they are almost always old males. Terrible conflicts often take place among the males, and it is not unusual to find the lower jaw deformed in consequence of having been dislocated or broken in them. See WHALE-FISHERY.

CACI'QUE, or Cazi'que, the designation given to the chiefs of Indian tribes in works relating to the central and southern parts of America. The word was derived by the Spaniards from the language of the former inhabitants of St Domingo.

CACODÆ'MON. See DEMON.

CA'CODYLE, or Ka'kodyle, is an organic substance containing carbon, hydrogen, and arsenic (C_4H_6As). It has been proposed to employ the oxide of C. (C_4H_6AsO) as a deadly agent in war. This compound, otherwise known as *Cadet's fuming liquor* or *alkarsine*, has the remarkable property of taking fire spontaneously when exposed to the air, and evolving abundant fumes of arsenic. Thus, a shell filled with it would, on bursting, saturate a space of ground, or the rigging of

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deck of a man-of-war, with a liquid which would quickly take fire of its own accord, and besides causing destruction by burning, would likewise spread death by its fumes.

CACO'NGO, or Malle'mba, an independent state of South Guinea, Africa, extending along the South Atlantic Ocean, in lat. 5° S., and stretching south-east as far as the river Bell. Its limits interiorly are not well defined. The country is generally flat, and the soil fertile. The principal towns are Kinguele, and Cacongo and Mallemba on the coast, the last once a great mart for slaves.

CA'CTEÆ, or Cacta'ceæ, a natural order of exogenous plants, consisting of succulent shrubs of very singular appearance. Linnæus included all the C. in the single genus *Cactus*, which is now divided into a number of genera; the name *Cactus*, however, still continuing in popular use, common to the whole order. Nearly 500 species are known, but the real number is probably much greater. The C. are without exception, natives of America, and their extraordinary forms constitute a remarkable feature in the vegetation of its warmer regions. All of them have fleshy stems, either simple or branched, often very soft and juicy; but in many, at least when old, having an easily distinguished woody axis, composed of annual rings, and covered with a layer of inner bark, so that the thick fleshy part may be regarded only as a layer of bark. Most of them are leafless; the *Pereskiæ* alone have true leaves, which are fleshy; and the *Opuntiæ* have rudimentary leaves, which soon fall off; but, instead of leaves, most of the order have clusters of hairs or prickles, where buds are formed in their stems, and these are very numerous, even in the species which in ordinary circumstances most rarely develop branches. The multiplicity of curious forms exceeds imagination; in many species (*Melocactidæ*, or Melon Thistles), the stem swells out into a globe; in others (*Torch Thistles*), it rises up as a column with many angles; in others (*Opuntiæ*, Indian Figs, or Prickly Pears), it divides in leaf-like articulations; in some (*Pereskiæ*) it assumes a tree-like form, in which the thick stem bears a head of branches, and reaches a considerable height, sometimes even thirty or forty feet. Those which have angular ribbed, and channelled, or flat and two-edged stems, shew a tendency to the cylindrical form as the stem advances in age. Some species have long creeping or trailing stems. The whole organisation of the C. adapts them for the endurance of long droughts; they vegetate vigorously during a part of the year, and then rest; the very absence of leaves concurring with the absence of pores or *stomata* in their tough skin to enable them to resist the action of a dry atmosphere and powerful sunshine, and to occupy arid soils and bare rocks, on which they are very generally found, often covering large tracts. Some of them grow rapidly on old lavas, and disintegrate them by their penetrating roots, thus preparing a soil for other plants; and the Prickly Pear is often planted in Sicily by the mere insertion of a branch or joint of it in a fissure of lava. Many species occur as *epiphytes* (q. v.) on the trees of American forests. Some also grow on high mountains, a few even reaching almost to the border of the snow. The plants of this order are a great boon to the regions in which they chiefly abound, which are, at least during great part of the year, very destitute of water; their stems containing a store of insipid and wholesome juice, of which both men and cattle avail themselves.—Some species, as the Prickly Pear (q. v.), produce a pleasant fruit.—The fruit of *Opuntia Tuna* affords a valuable pigment of the richest carmine color.

CADA'MBA, or Kudumba, the wood of several species of *Nauclea*, a genus of trees of the natural order *Cinchonaceæ*, natives of the East Indies, having flowers with a funnel-shaped corolla. *N. cadamba* is a noble tree, with orange-colored fragrant flowers, collected in heads about the size of a small apple. The leaves are from six to ten inches long. The wood is yellow, soft, and fine-grained. The tree is highly prized for the shade which it affords; the wood is used for various purposes. *N. cordifolia* is a large tree, plentiful in mountainous districts of Hindustan; the wood yellow, close-grained, and used for flooring-planks, packing-boxes, and many other purposes, as is also that of *M. parviflora*. All kinds of C. wood are, however, liable to be injured by moisture, and can only be used where they are to be kept dry.

The flowers of the C. are in general very short-lived: those of some night-flowering species, as of *Cereus grandiflorus*, well known in our hothouses, endure

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only for part of a single night. In the greater number, they are large and splendidly colored, in some they are very fragrant. The order is regarded as botanically allied to *Mesembryaceæ* (q. v.) and to *Grossulariaceæ* (q. v. Gooseberry, Currant, &c.).

The cultivation of the C. in green-houses and hothouses has been much in fashion for more than 80 years. The gardener must imitate the natural conditions of their growth, by giving water freely during a few months, and withholding it almost entirely during the rest of the year. Most of them are easily propagated by branches, taken off, and allowed to dry a little before being planted. The *Melocactidæ*, which do not readily produce branches, are made to do so by cutting off or burning out the central bud, that the means of propagating them may be obtained.

CA'DDICE, or Ca'ddice-fly (*Phryganea*), a Linnæan genus of insects of the order *Neuroptera*, a family in subsequent entomological systems, and constituted by Mr Kirby into a distinct order, *Trichoptera* (Gr. hairy-winged). The caddice-flies certainly differ in important particulars from the other neuropterous insects, and exhibit points of resemblance to the *Lepidoptera*. They have no mandibles, and the Maxillæ and lower lip are membranous and united; the head is small, with prominent eyes, and two additional small simple eyes situated on the forehead; the antennæ are long and bristle-like, composed of very numerous indistinct joints. Both wings and body are generally very hairy, and the wings, when at rest, are raised, and meet above the back like those of butterflies, from which, however, they differ much in form, being much more elongate: the legs are long. Caddice-flies are extremely active, particularly in the evening and at night, when the smaller species often fly in great numbers above streams and ponds. These insects are most interesting, however, on account of their larvæ, of which the larger kinds are the well-known *Caddice-worms*, or *Cad-bait* of anglers. They are of a long, almost cylindrical form, the head and first three segments hard, the remainder—the abdominal segments—soft. To the thoracic segments are attached the feet, six in number, as in the perfect insect. The larva lives always in water, feeding on aquatic vegetables. It spins by its mouth silken threads, by means of which, together with a viscid substance, it attaches together—and often in a very symmetrical manner, and with interesting peculiarities which differ in the different species—small hard substances, such as small stones, bits of stick, or small shells, even although they happened to contain living inmates, and thus constructs a case for itself, in which its soft body is protected, and from which only the head and hard thoracic segments are voluntarily protruded. When it changes into the pupa state, in which it differs little from the perfect insect, except in the imperfectly developed wings, it fixes its case to some solid substance beneath the water, and closes the two extremities with a kind of grating, which admits the free passage of water, necessary for respiration. Before assuming the perfect form, the pupa of the largest species breaks out of its case by means of a pair of hooks on the forepart of the head, and swims actively by means of the hind legs, or crawls by the other two pair. Many of the smaller species bring their pupa case to the surface of the water, and there take wing from it as from a boat. The species of caddice-fly are very numerous, and they are said to be more so in the north than in the south of Europe. About 200 British species have been described.—The angler looks for cad-bait about the edges of streams and under stones, or on the stalks of water-cresses, and other aquatic plants. As a bait for angling, the caddice is almost as deadly as the May-fly, and more so, in clear running streams, than the ordinary worm; the usual-sized bait-hook is used, upon which two of the baits are fixed, the angler proceeding exactly as in ordinary worm-fishing.

CADE, Jack, a historical character, leader of an insurrection which broke out in Kent, June 1450. Little is known of his personal history, further, than that he was an Irishman, and an illegitimate relation of the Duke of York, and hence called himself Mortimer. With 15,000 or 20,000 armed men of Kent, C. marched on London, and encamped at Blackheath, whence he kept up a correspondence with the citizens, many of whom were favorable to his enterprise. The court sent to inquire why the good men of Kent had left their homes; C., in a paper entitled "The Complaint of the Commons of Kent," replied, that the people were robbed of their goods, for the king's use; that mean and corrupt persons, who plundered and oppressed the com-

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mons, filled the high offices at court; that it was "noised that that the king's lands in France had been alienedd;" that misgovernment had banished justice and prosperity from the land; and that the men of Kent were especially ill-treated and over taxed, and that the free election of knights of their shire had been hindered. In another paper, called "The Requests by the Captain of the Great Assembly in Kent," C. demanded that the king should resume the grants of the crown, which he complained the creatures about the royal person fattened on, the king thus being compelled to live on taxation; that the false progeny of the Duke of Suffolk should be dismissed; and that the Duke of York and others should be restored to favor, and a number of persons punished. The court sent its answer in the form of an army, before which C. retreated to Sevenoaks, where he awaited the attack of a detachment, which he defeated. The royal army now objected to fight against their countrymen; the court made some concessions, and C. entered London on the 3d of July. For two days he maintained the strictest order; but he forced the mayor and judges to pass judgment upon Lord Say, one of the kings hated favorites, whose head C.'s men immediately cut off in Cheapside. On the third day some houses were plundered, the leader himself, it is said, setting the example. C., who at night lodged his army in the Borough, got news that the citizens intended to prevent his entrance into the city on the morrow, and in the night he made an attack on the bridge, but was defeated. A promise of pardon now sowed dissention among his followers, who dispersed, and a price was set upon C.'s head. He attempted to reach the Sussex coast, but was followed by an esquire, named Alexand r Iden, who fought and killed him, July 11. His head was stuck upon London Bridge, as a terror to traitors.

CADE'LLE (*Trogosita Mauritanica* or *caraboides*), an insect sometimes found in granaries in Britain, but seemingly imported from more southerly countries, where, as in France, its larvæ often commit great ravages among stored corn. They also live on bread, almonds, and even rotten wood. When full grown, they are about three-quarters of an inch long, flattened, fleshy, rough with scattered hairs, whitish, tapering toward the head; which is black, horny, and furnished with two curved jaws. The perfect insect is a glossy beetle of a deep chestnut color, marked with dotted lines. It belongs to the family of *Xylophagi*, of the order *Coleoptera* (q. v.), section *Tetramera*. The name C. is French.

CA'DENCE, in Music, is the finish of a phrase (in German, *Schluszfall*), of which there are three principal species—viz., the whole, the half, and the interrupted cadence. The whole C., which finishes on the harmony of the tonic, is also called the perfect C., and is always used at the end of a composition, and frequently called the final cadence. In its most perfect use, it consists of three chords—the one before the final being always the dominant. The half C., also called the imperfect C., is used to mark the termination of an idea or phrase, like the colon and semicolon; shewing a considerable division, but at the same time that a continuation is necessary. The harmony of the half C. is the reverse of the whole C., as it falls from the tonic to the dominant, and sometimes to the subdominant. In the interrupted C. (Ger. *Trugschluss*; Ital. *Cadenza d' inganno*), the preparation for the ordinary perfect C. is made; but instead of the harmony of the tonic following the dominant, another harmony quite strange is introduced, so that the ear is deceived. The more particular the preparation for the usual C. is made, the more strange and unexpected is the interruption, which can be made in so many ways that Reicha, in his "Traité de Haute Composition Musicale," gives 129 interrupted cadences.

CA'DENCY (from Lat. *cado*, to fall or decline). The marks by which the shields of the younger members of families are distinguished from those of the elder, and from each other, is an extensive, and, in so far as that term can be applied to heraldry at all, an important branch of the science. No distinction is usually made by writers on heraldry, and probably the practice of heralds in general scarcely admits of any being made between *marks of C.*, *differences*, *distinctions*, or even *brisures*, though the last term is pretty constantly, and quite appropriately used to include not only differences in general, but also abatements (q. v.) or bearings by which the arms of the family are broken or diminished. See BASTARD BAR. But there is a manifest convenience in the practice which is usually followed in Scotland, of appropriating the label, the crescent, the mullet, and the rest of the series of marks, commonly

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known as marks of C., to the purpose of distinguishing the sons from the father, and from each other, during the father's lifetime; and of adopting other distinctions—such as the bordeur of various kinds, the chief, engrailed, embattled, and the like, as differences between the coats of brothers, after the death of their father, and of the houses descended from them. Another very common mode of differencing the shields of brothers in early times, was by changing the tinctures; but this is now regarded as too extensive a change for such a purpose.

The differences at present used by the royal family will be found in most of the peerages. The rule with regard to them seems to be that, unlike subjects, they all bear the label of three points argent; but the label of the Prince of Wales is plain, whilst those of the other princes and princesses are charged with crosses. fleurs-de-lis, hearts, or other figures, for the sake of distinction. One of the most frequent reasons for matriculating the arms of the younger branches of families of distinction in the Lord Lyons Register, is that they may be properly distinguished from those borne by the head of the house.

CADE'NZA, in Music, an ornamental succession of notes introduced at pleasure by the performer at the finishing of a phrase.

CA'DER I'DRIS (Chair of Idris, a reputed giant), a picturesque mountain in Merionethshire, Wales, 5 miles south-south-west of Dolgelly. It consists of an immense ridge of broken precipices, 10 miles long, and 1 to 3 miles broad; the highest peak reaching an elevation of 2914 feet. It is composed of basalt, porphyry, and other trap rocks, with beds of slag and pumice. The view from the summit, which is very extensive, includes the Wrekin in Shropshire, and St George's Channel almost to the Irish coast.

CADE'T, Military (Fr. *cadet*, younger, junior in service—allied in derivation and meaning to cadency [q. v.] in heraldry), is a term applied in a general sense to a junior member of a noble family as distinguished from the eldest; and in France, any officer junior to another is a C. in respect to him. In a strict military sense, however, a C. is a youth studying for the public service.

In England, military cadetship has presented two aspects, according as it related to the East India Company's or to the royal service. When the Company possessed political and military authority in India, there were about 5000 English officers in their pay. Those who commanded the Company's own regiments had been professionally educated by the Company. A youth, nominated by the directors, was examined as to his proficiency in an ordinary English education, and admitted between the ages of 14 and 18 to Addiscombe School or College, near Croydon. If a probation of six months resulted satisfactorily, he entered upon a two years' course of study. If he passed through this ordeal well, he became a *C.* in the Company's service, receiving pay or salary, and being available for service in India, as opportunity might offer. The system of Indian cadetship underwent various modifications by the introduction of competition in the appointments, and by the transference of the Company's powers to the Crown; and ceased in 1861, when the accession of fresh officers to the local Indian armies was stopped.

The second aspect of military cadetship in England, adverted to above, is that of the Royal or Queen's cadets. The arrangements in operation until recently will be found noticed under SANDHURST COLLEGE; and the present arrangements are given under STAFF COLLEGE, and MILITARY ACADEMY, ROYAL.

CADE'T, Naval, is the lowest grade of officer in the royal navy. The cadets enter the royal service at 12 to 13½ years of age. Every captain, on being appointed to a ship in commission, is allowed to nominate one C.; every flag-officer (admiral, &c.) two, on hoisting his flag; each member of the Board of Admiralty, four; the two secretaries, two each; and all the rest are nominated by the First Lord of the Admiralty. The candidates are examined at the Royal Naval College at Greenwich; if they pass, they are sent for two years to the *Britannia* training-ship at Dartmouth, which is virtually a public school, for tuition in which the C.'s parent or guardian pays £70 a year. If they do not progress sufficiently in the training-ship, they are rejected; but if the report is favorable, they are put into sea-going ships. While on board, the C. is expected to watch and learn as much as possible of what is going on—saluting officers, tying knots, splicing ropes, arranging rigging, learning technical terms, going aloft, keeping the log, keeping watch, &c. If he pass

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from the *Britannia* with a first-class certificate, he becomes a midshipman at once; otherwise, according to the progress he makes. Cadets mess with the midshipmen on shipboard. There were 191 cadets on the navy estimates for 1878—1879, receiving each a shilling a day as pay or pocket-money.

CADETS' COLLEGE. A college with this designation was established in 1858 by a remodeling of the Junior Department of the Royal Military College at Sandhurst. Its objects were, to give a sound military education to youths intended for the army, and to facilitate the obtaining of commissions when the education was finished. The age of admission was between 16 and 19. The friends of a youth, able to pay the sums of money presently to be named, applied to the commander-in-chief for permission to place the youth on the list of candidates; this permission was usually granted on production of satisfactory certificates and references. The youth might go up for examination on any half-year. The list of subjects included English composition, continental languages, mathematics, history, geography, natural sciences, experimental sciences, and drawing. After the examination, the candidates were reported to the commander-in-chief in their order of merit. Those who had the most marks were admitted as cadets as soon as vacancies occurred in the college. When entered, they studied for two years on a great variety of subjects connected with military science and practice. The friends supplied clothing, books, and instruments. The annual payment for education, board, and lodging varied from £100 per annum down to £20; the highest sum being demanded for "the sons of private gentlemen," while the lowest was deemed sufficient for "the sons of officers of the army or navy who had died in the service, and whose families were proved to be left in pecuniary distress." Twenty of the youths were "Queen's cadets," sons of officers "who had fallen in action, or had died from the effects of active service, and had left their families in reduced circumstances." These 20 cadets were admitted and educated gratuitously. This system was abolished in 1870. Sub-lieutenants of cavalry and infantry, styled "student officers," who have done duty with a regiment for about 12 months, are now required to attend the college at Sandhurst, and go through a course of study for a year. At the end of it, on passing a satisfactory examination, they are promoted to the rank of lieutenant, and rejoin their regiments. See also MILITARY ACADEMY, ROYAL.

CADET'S FUMING LIQUOR. See CACODYLE.

CA'DI, an Arabic word signifying a judge or person learned in the law, the title of an inferior judge amongst the Mohammedan nations, who, like the Mollah (q. v.), or superior judge, must be chosen from the higher ranks of the priesthood, as all law is founded upon the Koran.

CA'DIZ (ancient *Gades*), an important commercial city of Spain, capital of the modern province of the same name, which forms a part of the great division of Andalusia; is situated at the extremity of the long narrow isthmus of the Isle of Leon, in lat. 36° 32′ n., and long. 6° 17′ w. The Atlantic Ocean washes its western and part of its southern side, and on the north and north-east it is enclosed by the Bay of Cadiz, a deep inlet of the Atlantic, forming an outer and an inner bay. Connected by only a narrow strip of ground (in some places not above 200 yards across) with the mainland, C. is admirably situated for defence; but though it has several sea and land fortifications, these are by no means considered impregnable. The town, which is surrounded by walls, forms nearly a square, each side being about a mile and a half in length. The houses being built of white stone, the city presents a remarkably bright and clean appearance from the sea. The streets are well paved and lighted, regular, but narrow, and there are some pleasant public walks, the most frequented of which is the Alameda. It has few public buildings of note; its two cathedrals are, on the whole, but poor specimens of ecclesiastical architecture, and its pictures, with the exception of one or two excellent pieces by Murillo, are of little value. C. declined greatly as a commercial city after the emancipation of the Spanish colonies in South America; but owing partly to the recent extension of the railway system in Spain, and partly to the establishment of some new lines of steamers, the trade has, within the last twenty years, revived considerably. To shew this, the value of the imports in 1856 was £1,383,435; in 1871, it was £2,044,861. So the values of the exports in the same years were £1,870,015 and £5,358,991. The number of Spanish ships which entered the port of C. in 1874 was 2677, with a

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tonnage of 815,333; of foreign ships, 962—tonnage, 300,730. The exports consist of wine, olive-oil, fruits, salt, and metals; and the manufactures of glass, coarse woollen cloth, soap, hats, leather, &c. Pop. about 72,000.

C. is one of the most ancient towns in Europe, having been built by the Phœnicians, under the name of Gaddir, 347 years before the foundation of Rome, or about 1100 B. C. It afterwards passed into the hands of the Carthaginians, from whom it was captured by the Romans, who named it Gades, and under them it soon became a city of vast wealth and importance. Occupied afterwards by the Goths and Moors, it was taken by the Spaniards in 1262. In 1587, Drake destroyed the Spanish fleet in the Bay; nine years later, it was pillaged and burned by Lord Essex; and in 1625 and 1702, it was unsuccessfully attacked by other English forces. After the revolution of 1808, C. became the headquarters of the insurrectionary junta, by whose orders it was separated from the mainland. The French, in February 1810, commenced a blockade, which they vigorously persevered in, capturing several of the forts, until August 25, 1812, when the victories of the Duke of Wellington forced them to abandon it. The city was besieged and taken by the French in 1823, and held by them until 1828. In the Spanish revolution of 1868, C. played a distinguished part.

CA'DMIA is the term applied to the crust formed in zinc furnaces, and which contains from 10 to 20 per cent. of cadmium.

CA'DMIUM is a metal which occurs in zinc ores, and, being more volatile than zinc, rises in vapor, and distils over with the first portions of the metal. See ZINC. C. is represented by the symbol Cd, has the atomic weight 56—new system, 112—and the specific gravity 8·6. It is a white metal, somewhat resembling tin; is malleable and ductile; fuses at 442° F., and rises in vapor a little above 600°. It is rarely prepared pure, and is not employed in the arts as a metal, though one or more of its salts have been serviceable in medicine. The sulphide of C., CdS, occurs naturally as the mineral *Greenockite*, and when prepared artificially, is of a bright yellow color. It is known as CADMIUM YELLOW, and is of great value to the artist. A great variety of tints are produced by mixing it with white-lead. Much of what is sold as Naples Yellow (q. v.) is thus prepared; but the genuine Naples Yellow has a greenish tint, which renders it easily distinguishable from the imitation. Cadmium Yellow, however, has many valuable qualities, which are causing it rapidly to supersede Naples Yellow.

CA'DMUS (according to Apollodorus and others) was the son of Agenor and Telephassa, and the brother of Europa. When the latter was carried off by Zeus, he and his brothers, as also their mother, were sent in quest of her, with injunctions from Agenor not to return without her. Their search was vain, and the oracle at Delphi told C. to relinquish it, and to follow a cow of a certain kind which he should meet, and build a city where it should lie down. He found the cow in Phocis, followed her to Bœotia, and built there the city of Thebes, about 1550 B. C. The myth of C., however, like other early Greek myths, abounds in contradictions, and it is wholly impossible to disentangle the historical facts from the meshes of fable in which they are imprisoned. To him is ascribed the introduction into Greece of an alphabet of 16 letters, derived from Egypt or Phœnicia, and the discovery of brass, or introduction of its use.

CADOUDAL, George, a distinguished leader in the Chouan or Royalist war in Brittany, was born near Auray, in Lower Brittany, where his father was a miller, in 1771. He was among the first to take up arms against the Republic, and soon acquired great influence over the peasants. Captured in 1794, he was sent as a prisoner to Brest, from which he soon made his escape, imprisonment having only increased his loyal ardor. Annoyed at the dissensions between the Vendean generals and the emigrant officers, and the disasters consequent thereon, C. organised an army in which no noble was permitted to command, and which Hoche, with all his great military talents, was unable to subdue or disperse. In 1799, C. was the soul of the conspiracy to overthrow the First Consul, and place a Bourbon on the throne; but the events of the 18th Brumaire disarranged the plans of the conspirators. Bonaparte recognised C.'s energy and force of character, and offered to make him a lieutenant-general in his army, which offer C. refused, as well as another of a pension of a hundred thousand francs, if he would only consent to remain quiet.

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Bonaparte attempted to arrest him, but he fled to England, where, in 1802, he conspired with Pichegru for the overthrow of the First Consul. With this design he went to Paris, but was arrested, condemned, and executed June 25, 1804. C. was a man of stern honesty and indomitable resolution. "His mind was cast in the true mould; in my hands he would have done great things," was Napoleon's estimate of him.

CADU'CEUS, the winged staff of Mercury, or Hermes, as he was called by the Greeks, which was supposed to give the god power to fly. The C. in the actual world was the staff or mace carried by heralds and ambassadors, from which circumstance, no doubt, it came to form one of the attributes of the messenger of the gods. Originally, it was simply an olive-branch, the stems of which were afterwards formed into snakes, in accordance with several poetical tales invented by the mythologists. One of these was to the effect that Mercury, having found two snakes fighting, divided them with his rod, and that thus they came to be used as an emblem of peace. Many miraculous virtues were ascribed to the caduceus. On the coinage of antiquity, the C. is often given to Mars, who holds it in the left hand, a spear being in his right, to shew how peace and war alternate. It is also seen in the hands of Hercules, Bacchus, Ceres, Venus, &c. Amongst the moderns, the C. is used as an emblem of commerce, over which Mercury was the presiding divinity.

CÆCI'LIA (Lat. *cæcus*, blind), a genus of reptiles, formerly placed among serpents, on account of their form, although, in their anatomical structure, peculiarities were observed allying them to Batrachians, with which they are now ranked, the important fact having been ascertained of their breathing by gills when young, and undergoing a metamorphosis. The body is almost cylindrical or worm-like, the head small, the eyes very small, and nearly hidden by the skin; in some species, indeed, imperfect or wanting, upon which account the name C. was given to them, and an attempt has been made to transfer to them the English name Blindworm, commonly given to the *Anguis fragilis*. The skin is smooth, viscous, and annularly wrinkled, appearing naked, although, upon dissection, minute scales are found disposed between its wrinkles, at least in some species. The vertebræ are articulated as in fishes and in some of the other lower Batrachians, not as in serpents, and the skull is united to the first vertebra by two tubercles. The ribs are imperfectly developed, and much too short to encircle the trunk.—The original genus C. has been subdivided, now forming a family, *Cæcilidæ*. The species are inhabitants of warm climates, and of marshy or moist places.

CÆ'CUM (Lat. *cæcus*, blind) a blind sac; that is, a sac or bag having only one opening, connected with the intestine of an animal. In man, there is only one C., very small, and apparently not performing any important function, situated at the extremity of the small intestine, where it terminates in the large intestine or colon. In many of the mammalia, however, and particularly in most of those which are herbivorous, it is comparatively large, and is found to secrete an acid fluid resembling the gastric juice. It therefore appears that, where the nature of the assimilatory process is such as to require the detention of the food for a considerable time, this provision is made for it, in order that digestion may be more completely accomplished. The C. is entirely wanting in some quadrupeds, as in bats, and the bear and weasel families. Birds have two cæca, which are generally long and capacious in those that are omnivorous or granivorous, and the position of which is the only circumstance that marks the division of the intestine into two parts, the small and the large intestine, or the *ileum* and the *colon*. In reptiles, a C. is of a very rare occurrence. Fishes have none in the position occupied by those of quadrupeds and birds, but many of them have cæca attached to the intestine at its uppermost part, and very generally regarded as appendages of the stomach. The number of these cæca, is, however, extremely various; sometimes there are only 2, and sometimes more than 100. The number is different even in very nearly allied species of the same family; thus, there are only 6 in the smelt, but 70 in the salmon; 24 in the herring, and 80 in the shad. In some fishes, as the cod, the cæca consist of large trunks ramified into smaller ones.—The intestinal canal of some of the *Infusoria* is furnished throughout its whole length with numerous cæca, no other organ corresponding to a stomach appearing to exist.

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CÆDMON, the first Anglo-Saxon writer of note who composed in his own language, and of whom there are any remains. The date of his birth is unknown, but his death occurred about 680 A.D. He was originally a cow-herd, attached to the monastery of Whitby, and, according to Bede, "even more ignorant than the majority of his fellows, so that in the evenings, when the domestics assembled in the hall to recreate themselves with music after the labors of the day, Cædmon was frequently obliged to retire, in order to hide his shame when the harp was moved towards him." One night, however, as he was sleeping in the stable-loft, a stranger appeared to him, and commanded him to sing. C. declared his ignorance, but the stranger would take no refusal, and imposed on the poor cow-herd the sublime task of hymning the glories of creation. Suddenly, a poetic inspiration seized him, and he began to pour forth verses. When he awoke from his dream, the words remained fast-rooted in his memory, and were recited by him to others with new confidence. The Abbess Hilda, and the learned men who were with her in the monastery, immediately declared that he had received the gift of song from Heaven. He was now educated, became a monk, and spent the rest of his life in composing poems on the Bible histories and on miscellaneous religious subjects, many of which have been preserved, and are altogether in bulk nearly equal to the half of "Paradise Lost," to parts of which some of them bear a striking resemblance. Satan's Speech in Hell is characterised by a simple yet solemn greatness of imagination, which may possibly have influenced at some period of his life the more magnificent genius of Milton.

CÆLATURA. See CHASING.

CAEN, the chief town in the department of Calvados, France—formerly the capital of Lower Normandy—is situated on the left bank of the Orne, about 9 miles from its mouth, 122 miles west-north-west of Paris. C. is built in the middle of a fertile plain; its streets are wide and clean, it has several fine squares, and many noble specimens of ancient Norman architecture. Among the best examples are the churches of St Etienne, founded by William the Conqueror, and which contained his monument, erected by William Rufus, and destroyed by the Huguenots in 1562; La Trinité, called also *Abbaye aux Dames*, founded by Matilda, wife of the Conqueror; St Nicholas, now a cavalry fodder-store; St. Pirrre and St Jean. The castle founded by the conqueror and finished by Henry I. of England, was partially destroyed in 1793. There are several beautiful promenades in the city, which has manufactures of lace, blonde crape, cutlery, cotton-yarn; breweries, dye-works, wax-bleaching, and shipbuilding yards. Its Angora gloves, made from the unwashed, undyed fur of Angora rabbits which are reared in the district, are celebrated. Quarries in the neighborhood produce an excellent stone, called Caen Stone (q.v.). Trade is facilitated by a maritime canal connecting the port with the sea, and also by the railway connecting it with the Paris and Rouen line; those to Cherbourg, Tours, and Honfleur, and that to Flers, opened in 1867, which affords C. communication with Granville. Nothing is known of C. before the 9th century. It was a place of importance in 912, when it came into the possession of the Normans, under whom it increased rapidly. William the Conqueror and his queen made it their residence, and greatly improved it. In 1346, it was taken and pillaged by the English, who again captured it in 1417. It was held by them until 1450, when the French compelled them to surrender. During the revolution of 1793, several of the Girondist chiefs, proscribed by the Jacobins, went to C., and organised a revolt against the Mountain, which proved unsuccessful. Pop, (1872) 32,999.

CAEN STONE. The neighborhood of the town of Caen, in Normandy, has been celebrated for its stone-quarries from a very early period. The excellence of the stone, and the facility of transport by sea, led to C. S. being very extensively used in England in the 15th and 16th centuries. In 1460, the Abbot of Westminster obtained a licence to import C. S. for the repairs of the monastery. Later, it became a regular article of importation, and in 1582 it was rated at the custom-house at 6s. 8d. the ton. Winchester and Canterbury cathedrals, Henry VII.'s Chapel at Westminster, and many country churches, are built of C. S., which is still frequently used in England. The stone is an oolite, resembling Stonesfield slate, but without its slaty structure. The quarries are subterraneous, and the stone is brought up through vertical shafts in blocks 8 or 9 feet long, and about 2 thick.

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CAERLE'ON (Castle of the Legion), a small but ancient town in Monmouthshire, on the right bank of the Usk, 2 miles north-east of Newport. It is the Isca Silurum of the Romans, and is supposed to have been the capital of the Roman province Britannia Secunda, now Wales, and the residence of the famous King Arthur. It was the seat of an ancient archbishopric, which was removed to St Davids about 519 A.D. An abbey of Cistercian monks existed here before the Reformation. C. was an important place in the 12th c., but it was afterwards ruined by the frequent wars between the Welsh and Anglo-Saxons. Many Roman relics have been found here, as aqueducts, baths, pavements, altars, tiles, coins, inscriptions, and statues; many of the smaller antiquities are deposited in the museum in the town; besides half-melted ore and cinders, and the remains of a fortress, with walls 12 feet thick and 1800 yards long, and of an amphitheatre, called King Arthur's Round Table, 222 by 192 feet in size. Pop. (1871) 1306. The chief occupation is the manufacture of tin-plates.

CAERMA'RTHEN, (Welsh *Caer Fyrrdyn*, the *Maridunum* of Ptolemy), a seaport town, capital of Caermarthenshire, South Wales, on the right bank of the Towy, 9 miles from Caermarthen Bay. It lies in a picturesque situation, but the streets are irregular, steep, and often narrow. The Towy is navigable for vessels of 200 tons up to the town, and salmon and sewin are caught in the river. There are tin and iron works near the town. C. exports tin-plates, cast iron, timber, marble, bark, slates, lead ore, bricks, grain, butter, and eggs. The Welsh language is used in most of the churches. C. is a county borough, having a separate jurisdiction from the shire. It unites with Llanelly in returning one member to parliament. Pop. (1871) 10,488. There is a college for Welsh teachers. Near C. are the remains of two Roman camps. In the 5th c., Merlin, the Welsh prophet, is said to have been born here. It was long the residence of the native princes of South Wales. Caermarthen Castle often changed hands in the contests of the Welsh chiefs with each other, and in the subsequent wars with the Saxons and Normans.

CAERMA'RTHENSHIRE, a maritime county in South Wales, on the Bristol Channel; bounded n. by Cardigan, from which it is separated by the Teify; e. by Brecknock; s. by Glamorgan and Caermarthen Bay; and w. by Pembroke. It is the largest of the Welsh counties; length, 53 miles; greatest breadth, 33 miles; area, 974 square miles, nearly a third of which is waste. The county is mountainous in the north and east, and is characterised by productive though narrow valleys and deep wooded glens. Caermarthen Van or Beacon rises to the height of 2596 feet, being the greatest elevation in the county. The coast of C. is marshy, and is all situated on Caermarthen Bay, which washes also small portions of the coasts of Glamorgan and Pembroke, is 17 miles across, 10 miles deep, 35 in circuit, and receives the rivers Taff or Tave, Towy, and Lhoughor. The chief rivers of C. are the Towy, Cothy, Taff, and Teify. The Towy has a course of 60 miles, of which 50 are in Caermarthenshire. It yields plenty of salmon, sewin, trout, eels, and lamprey, and is navigable for the last 9 miles of its course. On this river is the celebrated vale of the Towy, 30 miles long, with an average breadth of 3 miles. C., north and west of the Towy, comprising three-fourths of the county, consists of lower Silurian clay-slate and grauwacke. In the south-east corner of the county is a band of carboniferous limestone and grit, to which succeeds a small part of the South Welsh coal-field of Glamorgan and Monmouth, chiefly composed of stone-coal and culm. The mineral productions of the county are iron, coal, copper, lead, slates, lime, dark-blue marble. These, with tinned iron, grain, cattle, horses, sheep, and butter, are exported. The climate of C. is mild, but moist; the soil is stiff and poor in the uplands, affording pasturage for small cattle; but the rest of the county is well wooded, and in the south part along the rivers very fertile. Oats and barley are the chief crops. The chief towns are Caermarthen (the county town), Llanelly, Llandeilio-vawr, Llandovery, Newcastle-in-Emlyn, and Kidwelly. The chief manufactures are woollens and hides. Pop. (1871) 115,710. C. sends two members to parliament. The county contains so-called Druidical remains, and Roman roads, besides many baronial and ecclesiastical ruins. In this county originated the "Rebecca riots," which in South Wales, in 1843—1844, were directed against the turnpike-gates.

CAERNA'RVON (*Caer-yn-ar-Fon*, Fort opposite Mon or Anglesea), a parliamentary and municipal borough and seaport in North Wales, the capital of Caernar-

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vonshire. situated near the south end of the Menai Strait, on the right bank of the Seiont, 245 miles north-west of London. C. has a castle situated at the west end of the town, the building of which was commenced by Edward I. in 1284. It is one of the noblest ruins in the kingdom, the walls being still entire, and enclosing an oblong of three acres. The walls are 7 to 9 feet thick, and are pierced by a covered gallery, with loopholes to discharge arrows. There are thirteen embattled towers, with five, six, or eight sides, and surmounted by turrets. The gateway under the great square tower has four portcullises. The town itself was once surrounded by walls and round towers. These walls, with several of the gates, still exist, but are now within the town. The streets are narrow, but regular, and at right angles to each other. In the churches and chapels, the services are in Welsh and English. C. unites with Pwllheli, Nevin, Criccieth, Conway, and Bangor in returning one member to parliament. In 1876, 939 vessels, with a burden of 73,275 tons entered, and 1900 vessels, with a burden of 144,584 tons, cleared the port, chiefly small craft and steamers to and from Liverpool. The harbor admits of ships of 400 tons. The chief exports are copper ore, coal, and slates. There is also a great iron and brass foundry. C. is a bathing-place, and is much frequented by tourists, on account of its vicinity to the grandest scenery in North Wales. Many families of the upper ranks reside in and around the town. Pop. (1871) 9449. Half a mile from C. are the remains, covering seven acres, of Segontium, or Caer Seiont, a Roman station or city. Gold, silver, and copper coins and ornaments, and other Roman relics, have been found here. There is a Roman fort on the left bank of the Seiont, still almost complete, with walls 11 feet high, and 6 feet thick, and with parallel rows of holes 3 inches in diameter. C. was the seat of the native princes of North Wales down to 873. In 1284 was born here the first Anglo-Norman Prince of Wales, afterwards the unhappy Edward II. In 1294, the town and castle were burned, and the English inhabitants massacred by the Welsh under Madoc, the illegitimate son of Llewelyn, a native prince of Wales. From a rocky height near Uxbridge Hotel, there is a fine view of Snowdon and the island of Anglesea.

CAERNA'RVONSHIRE, a maritime county in North Wales, bounded n. by the Irish Sea; e. by Denbigh, with the Conway between; s. by Merioneth and Cardigan Bay; and w. by Caernarvon Bay and the Menai Strait, the latter separating it from Anglesea. It is 51 miles long; greatest breadth, 22 miles; average, 9; area, 544 square miles, of which ⅓ is in pasture, and only $\frac{1}{10}$th in tillage. The surface is mountainous, and is traversed by the grandest and highest ranges in South Britain, and it is the highest and most mountainous county in North Wales. The Snowdonian or chief range runs through the middle of the greatest length of the county, from south-west to north-east, and is very bold and rocky. It attains its greatest elevation in Snowdon (q. v.), 3571 feet, in the centre of the county, and the highest mountain in South Britain. Caernarvon Bay is 30 miles across, 15 long, with 2 to 30 fathoms water, and communicates with the Irish Sea through the Menai Strait, which is 17 miles long, and ½ to 4 miles broad. The rivers of C. are numerous, but small, from the nearness of all parts of the county to the sea. The Conway, navigable for 10 miles, which runs along the east border, is the chief. Almost all the streams flow through small lakes or tarns—of which there are 50 or 60 in the county—around the central or Snowdonian group of mountains. There are many fine cataracts on these streams. The mineral products of C. are copper, lead, zinc, coal, roofing and writing slates, slabs, chimney-piers, bonestone. The slate-quarries employ many thousands of workmen. The climate is mild in the peninsular part of C., but severe among the hills. The chief branch of rural industry in C. is the rearing of black-cattle for the dairy, and of small sheep. Wheat, oats, barley, and potatoes are raised in the valleys. Pop. (1871) 106,121. The chief towns are Caernarvon, (the county town), Bangor, Pwllheli, Conway, Nevin, and Criccieth. In addition to the above boroughs, several flourishing towns have recently sprung into existence in the county—Llandudno, Tremadoc, and Bethesda being the principal. It returns two members to parliament—one for the county, and one for the six chief towns. Connected with C. is the Chester and Holyhead Railway, on the great route from London to Dublin, which crosses into Anglesea by the Britannia Tubular Bridge over the Menai Strait. C. contains the remains of British or Celtic camps and hill-forts, especially around

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Snowdon, several dolmens and stone circles, and some ancient castles. The Snowdonian mountains were long the stronghold of the Welsh against the Romans, Saxons, and Normans in their efforts to subjugate Wales, and here the Welsh were at last defeated in 1283 by Edward I.

CÆSALPI'NIA, a genus of trees of the natural order *Leguminosæ* (q. v.), the type of the sub-order *Cæsalpinieæ*. This sub-order is characterised by irregular flowers, which are not papilionaceous (q. v.), and contains upwards of 700 known species, among which many are notable for their purgative properties, as Senna (q. v.); some produce eatable fruits, as the Tamarind (q. v.), the Carob (q. v.), and the west Indian Locust Tree (q. v.); some yield resinous and balsamic products, as Copaiva (q. v.), Aloes-wood (q. v.), &c.; some produce important dye-woods, as Logwood (q. v.), Brazil Wood, (q. v.), Camwood, (q. v.), &c.; and some are trees of great size, and very valuable for their timber, as the Purple-heart (q. v.) and the Wallaba (q. v.), trees of Guiana. No species of the sub-order is British, and it generally belongs to warm climates.—The genus C. contains a number of species, trees with pinnate or bipinnate leaves, natives of the warm parts of Asia and America, which yield the Brazil Wood, Pernambuco Wood (see BRAZIL WOOD), and Sappan Wood (q. v.) of commerce, also the the astringent pods called Dividivi (q. v.), used in tanning.

CÆSAR, the name of a patrician family of the *Julia Gens*, one of the oldest in the Roman state, claiming to be descended from Iulus, the son of Æneas. When or from what cause the surname of C. was first acquired, is in the highest degree uncertain. Spartianus, in his "Life of Ælius Verus," mentions four different opinions respecting its origin: 1. that the word signified an elephant in the language of the Moors, and was given as a surname to one of the Julii because he had killed an elephant; 2. That it was given to him because he had been cut (*cæsus*) out of his mother's womb after her death; 3. Because he had been born with a great quantity of hair (*cæsaries*); or, 4. Because he had azure-colored eyes (*cæsii*). The opinion to which we most incline is the third of these, but who was the original "shock-head" of the gens we cannot say; the first, however, mentioned in history is Sex. Julius Cæsar, prætor, in 208 B. C. The greatest individual of the family, and one of the greatest men the world has ever seen, was

CÆSAR, Caius (or rather Gaius) JULIUS, son of a Roman prætor of the same name, was born 12th July, 100 B. C. Two circumstances conspired to determine his sympathies in favor of democracy, and against a republican oligarchy; the first was the marriage of his aunt Julia with Caius Marius; the second, the marriage of C. himself, in 83 B. C., with Cornelia, daughter of L. Cinna, one of the principal enemies of Sulla. The anger of the dictator at this cost C. his rank, property, and almost his life itself. Feeling that he would be safer abroad for a time, he went to Asia, 81 B. C.; but on learning the death of Sulla (78 B. C.), he hurried back to Rome, where he found the popular party in a state of great ferment, and anxious to regain what it had lost under the vigorous despotism of the aristocratic dictator. C., however, took no part in the attempts of Lepidus to overthrow the oligarchy; but he shewed his political leanings by prosecuting (77 B. C) Cn. Dolabella—a great partisan of Sulla—for extortion in his province of Macedonia. To improve his eloquence, he went to Rhodes to study under the rhetor Apollonius Molo. In 74 B. C., he returned to Rome, where he had been elected pontifex, and now for the first time threw himself earnestly into public life. In the year 70 B. C., he attached himself to Pompey, whose political actions at this time were of a decidedly democratic character. In 68 B. C., C. obtained a quæstorship in Spain. On his return to Rome (67 B. C.), he married Pompeia, a relative of Pompey, with whom he was daily becoming more intimate. In 66 B. C. he was elected to the curule ædileship, and lavished vast sums of money on games and public buildings, by which he increased his already great popularity. For the next few years, C. is found steadily skirmishing on the popular side. In 63 B. C. he was elected pontifex maximus, and shortly after, prætor. During the same year occurred the famous debate on the Catiline conspiracy, in which the aristocratic party vainly endeavored to persuade the consul, Cicero, to include C. in the list of conspirators. In 62 B. C., Pompey returned from the East, and disbanded his army. Next year, C. obtained the province of *Hispania Ulterior*. His career in Spain was brilliant

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and decisive. On his return he was elected consul, along with M. Calpurnius Bibulus. Shortly before the passing of the agrarian law (59 B. C.), C., with rare tact and sagacity, had reconciled the two most powerful men in Rome, who were then at variance, Pompey and Crassus, and had formed an alliance with them, known in history as the *First Triumvirate*. Both of these distinguished men aided C. in carrying his agrarian law; and to strengthen still further the union which had been formed, C. gave Pompey his daughter Julia in marriage, though she had been promised to M. Brutus; while he himself also married Calpurnia, daughter of L. Piso, his successor in the consulship. On the expiry of his term of office, he obtained for himself, by the popular vote, the province of *Gallia Cisalpina* and *Illyricum* for five years, to which the senate added—to prevent the popular assembly from doing so—the province of *Gallia Transalpina*. Nothing could have been more favorable for C.'s aims. He had now an opportunity of developing his extraordinary military genius, and of gathering round him an army of veterans, whom perpetual victory should inspire with thorough soldierly fidelity and devotion to his person. This was the very thing he wanted to give him a reputation equal to that of his coadjutors, Pompey and Crassus, whom, in genius, he far surpassed. Leaving, therefore, the political factions at Rome to exhaust themselves in petty strifes, C., in 58 B. C., after the banishment of Cicero, repaired to his provinces, and during the next nine years, conducted those splendid campaigns in Gaul, by which, had he done nothing else, he would have "built himself an everlasting name." C.'s first campaign was against the Helvetii, whom he totally defeated near Bibracte (Autun). Out of 368,000 only 110,000 remained. These were commanded by C. to return home and cultivate their lands. The eyes of the Gauls were now turned upon the new conquerer. His help was solicited, among others, by Divitiacus, an Æduan chief. This involved C. in a second war with a German prince, named Ariovistus, who was utterly overthrown; and now C., having in the course of one campaign successfully concluded two important wars, led his troops into winter-quarters.

Next year (57 B. C.) occurred the Belgic war, in which C. successively routed the Suessiones, Bellovaci, Ambiani, and Nervii, who, alarmed at the progress of the Roman arms, had entered into an alliance with each other against the invaders. When the senate received C.'s official dispatches, it decreed a thanksgiving of 15 days—an honor never previously granted to any other general. During the winter and the spring following, C. stayed at Lucca; and after spending large sums of money in hospitality, and in other less praiseworthy purposes, he departed for Gaul, where the flames of war had burst out in the north-west. The Veneti, a maritime people of Brittany, were the chief instigators of the insurrection. C.'s plans were laid with consummate skill, and were crowned with the most splendid success. The Veneti were totally defeated, and most of the other Gallic tribes were either checked or subdued. C. wintered in the country of the Aulerci and Lexovii (Normandy), having, in the course of three campaigns, conquered Gaul. Next year (55 B. C.), Crassus went to Syria, and Pompey to Spain, while C.'s provincial government was prolonged for five years. He now undertook a fourth campaign against two German tribes who were about to enter Gaul. He was again successful; and pursuing the fleeing enemy across the Rhine, spent eighteen days in plundering the district inhabited by the Sigambri. He next invaded Britain, about the autumn; but after a brief stay in the island, returned to Gaul. The Roman senate, astonished at his hardihood and his successes in regions where no Roman army had ever been before, accorded him a public thanksgiving of 20 days. In 54 B. C., C. opened his fifth campaign by a second invasion of Britain. On his return to Gaul, C. was compelled—on account of the scarcity of corn, arising from drought—to winter his army in divisions. This naturally aroused the hopes of the Gauls, who thought the time had come for recovering their independence. An insurrection broke out in the north-east of Gaul, which was at first partially successful, but was ultimately crushed. C. resolved to winter at Samarobriva (Amiens), in the vicinity of the malcontents. In 53 B. C., C. commenced his sixth campaign. It was chiefly occupied in crushing a second insurrection of the Gauls. C. now returned to Northern Italy, that he might be able to communicate more easily and securely with his friends at Rome. That city was gradually becoming more anarchic, the evils of weak government more apparent; the hour for decisive action seemed to be approaching, and doubtless C.'s

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heart beat with expectation of the mighty future, when all at once the plot that Fate was weaving in his favor, appeared to be completely marred by a tremendous rebellion over the whole of Gaul, headed by a young warrior named Vercingetorix. It was in the dead of winter when the news came to C., who instantly saw that at all hazards, he must preserve his fame and his army. Leaving, therefore, Pompey to succeed at Rome, he hurried to meet the insurgent hordes. His great difficulty was to collect his scattered legions. First crossing, with some Cisalpine and provincial troops, the mountains of Auvergne, though they lay six feet deep in snow, he suddenly appeared among the Arverni, who, terrified at his unexpected approach, sent for their chief, Vercingetorix, to come to their assistance. This was what C. wished. After some wonderful exhibitions of military skill, and numerous successes, Vercingetorix was shut up in Alesia (Alise in Burgundy) with all his infantry. C. besieged him, and though harassed by nearly 300,000 Gauls without, who attempted, but in vain, to break through the well-defended Roman lines, forced Vercingetorix to capitulate. Many of the tribes now hastened to submit to C., who prudently determined to winter among the vanquished. The senate, of course, voted him another public thanksgiving. Next year (51 B. C.), C. proceeded to quell the tribes who still held out. This he successfully accomplished, and having in addition reduced the whole of Aquitania, passed the winter of his eighth campaign at Nemetocenna, in Belgium, where he spent the time both in a magnanimous and politic manner. The Gallic princes were courteously and generously treated; the common people were spared the imposition of further taxes, and everything was done to render it possible for him to visit Italy with safety in the spring. This he did, and took up his residence at Ravenna, where he was informed of everything that was going on by the tribune C. Curio. There can be no doubt that at this moment he was the most popular man in the state, while his soldiery were devoted to him with a loyalty as enthusiastic as that which Bonaparte inspired when fresh from his Italian victories.

Meanwhile, Pompey, whose vanity could not endure the greatness of C., had been gradually veering round again to the aristocracy, whose dread of the new conqueror was hourly increasing. After much futile diplomatic finessing on all sides, the senate carried a motion "that C. should disband his army by a certain day; and that if he did not do so, he should be regarded as an enemy of the state." The tribunes, Mark Antony and Q. Cassius put their veto on this motion; but they were violently driven out of the senate-chamber, and fearing for their lives, they fled to C.'s camp. The senate, in the madness of their terror, now declared war, and intrusted the conduct of it to Pompey, whose pride in the invincibility of his military prowess hindered him from taking the necessary measures for the defence of the state. He fancied that his name would bring thousands to his standard, and he was even led to believe that C.'s troops were willing to desert their general: the result of which delusion was, that when hostilities formally commenced, he had hardly any soldiers except two legions which had recently been in the service of his rival. C., on the other hand, perceiving that the time for decisive action had at length come, harangued his victorious troops, who were willing to follow him anywhere; crossed the Rubicon (a small stream which separated his province from Italy Proper), and moved swiftly, amid the acclamations of the people, towards Rome. Pompey fled to Brundusium, pursued by C., but contrived to reach Greece in safety, 17th March, 49 B. C. The Italian cities had everywhere gladly opened their gates to the conqueror as a deliverer. In three months, C. was master of all Italy.

C. next subdued Pompey's legates in Spain, who were at the head of considerable forces. On his return, he took Massilia, where he learned that he had been appointed dictator of the republic—a function which at this time he retained only for 11 days, but these were honorably distinguished by the passing of several humane enactments. Pompey, now thoroughly alive to the magnitude of his danger, had gathered in Egypt, Greece, and the East, a powerful army, while his fleet swept the sea. C., however, crossing the Adriatic at an unexpected season, made a rush for Dyrrhachium, where Pompey's stores were; but was nevertheless outstripped by his opponent. Pompey intrenched his army on some high ground near the city, where he was besieged by C. The first encounter was favorable to Pompey, who drove back C.'s legions with much loss. The latter now retreated to Thessaly, followed by his exulting enemies. A second battle ensued on the plains of Pharsalia, 9th

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August, 48 B. C. Pompey's army was utterly routed; Pompey himself fled to Egypt, where he was murdered. See POMPEY.

No sooner had the news reached Rome, than C. was again appointed dictator for a year, and consul for five years. He was invested with tribunicall power for life, and with the right of holding all the magistricial comitia except those for the election of the plebeian tribunes. He did not, however, return to Rome after the battle of Pharsalia, but went to Egypt, then in a distracted condition on account of the disputes regarding the succession. Out of love for Cleopatra (who subsequently bore him a son), he entered upon the "Alexandrine War," in which he was successful, and which he brought to a close in March 47 B. C. He next overthrew a son of Mithridates, near Zela, in Pontus, August 2 of the same year, and arrived in Rome in September. He was once more appointed dictator, and the property of Pompey was confiscated and sold. Before the close of the year, he had set out for Africa, where his campaign against the Pompeian generals, Scipio and Cato, was crowned with victory at the battle of Thapsus, 6th April 46 B. C. Cato committed suicide at Utica, and with such irresistible celerity was the work of subjugation carried on, that by the end of the summer, C. was again in Rome. Now occurred that display of noble and wise generosity which proves C. to have been possessed of a great magnanimous nature. He was not a man that could stoop to the vulgar atrocities of Marius or Sulla, and so he majestically declared that henceforth he had no enemies, and that he would make no difference between Pompeians and Cæsarians. His victories in Gaul, Egypt, Pontus, and Africa, were celebrated by four great triumphs, during which the whole Roman populace was feasted, and fêted by the magnificent liberality of the dictator.

He now proceeeded to check, by wholesome enactments, as far as in him lay, the social evils which had long flourished in the city. During the year 46 B. C., also, he conferred a benefit on Rome and on the world by the reformation of the calendar, which had been greatly abused by the pontifical college for political purposes. After quelling an insurrection which now broke out in Spain, where Pompey's sons, Cneius and Sextus, had collected an army, he received the title of "Father of his Country," and also of *imperator*, was made dictator and *præfectus morum* for life, consul for 10 years; his person was declared sacred, and even divine; he obtained a bodyguard of knights and senators; his statue was placed in the temples; his portrait was struck on coins; the month Quintilis was called Julius in his honor; and on all public occasions he was permitted to wear the triumphal robe. He now proposed to make a digest of the whole Roman law for public use, to found libraries for the same purpose, to drain the Pontine Marshes, to enlarge the harbor of Ostia, to dig a canal through the Isthmus of Corinth, and to quell the inroads of the barbarians on the eastern frontiers; but in the midst of these vast designs he was cut off by assassination on the Ides (15th) of March, 44 B. C. The details of this crime—the greatest disaster that could have befallen the Roman world, as subsequent events shewed—are too familiar to require narration. It is sufficient to say that, of the sixty aristocrats who were in the conspiracy, many had partaken of C.'s generosity, and all of his clemency. A few, like Brutus, out of a weak and formal conscientiousness, based on theory rather than insight, were probably offended by C.'s desire to change the form of government into a hereditary monarchy; but the most, like Cassius, were inspired by a spleenful hatred of the dictator, and the base ambition of regaining power at all hazards.

C., who was 56 years of age when he was murdered, was of a noble and kingly presence, tall of stature, and possessing a countenance, which, though pale and thin with thought, was always animated by the light of his black eyes. He was bald-headed (at least in the latter part of his life), wore no beard, and though of a rather delicate constitution naturally, he ultimately attained to the most vigorous health. His besetting sin was sensuality; but without meaning to detract from the criminality of his conduct in this respect, it may be said that it was as much the sin of the times in which he lived as his own, and that the superlative grandeur of his position gave a prominence to his licentiousness which a more humble lot would have escaped. His intellect was marvellously versatile. In everything he excelled. He was not only the first general and statesman of his age, but he was—excepting Cicero—its greatest orator. As a historian, he has never been surpassed and rarely equalled in simplicity and vigor of style, and in the truthfulness with which he nar-

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rates events of which he was an eye-witness. He was, in addition, a mathematician, philologist, jurist, and architect, and always took great pleasure in literary society. Most of his writings have been lost, though their titles are preserved; but we still possess his invaluable "Commentarii" (generally known as "Cæsar's Commentaries on the Gallic and Civil Wars"). The "editio princeps" was printed at Rome 1469. C.'s life was formally written in ancient times by Suetonius and Plutarch, while notices of him are found in Dion Cassius, Appian, Velleius Paterculus, and Cicero.

CÆSARE'A (*Turris Stratonis*), called by the natives "Kaisari'yeh." This once proud and splendid seaport, perhaps one of Herod's most magnificent works—a Grecian town with its temples, amphitheatre, baths, &c., imported into Syria—was situated on the coast of Syria, 95 miles south of Beyrout, and 37 miles north of Jaffa.

In 65 A.D., Gessius Florus, the worst of all the petty tyrants that had afflicted Judæa, was appointed governor of Cæsarea. About that time, a terrible revolution which commenced at C., broke out all over Judæa. It arose from a dispute between the Syrian and Jewish citizens of C. as to which of them the city really belonged to; and some idea may be formed of the extent of the insurrection from the fact, that above 20,000 Jews were massacred in C. in the space of one hour; 13,000 in one night at Scythopolis; 50,000 at Alexandria; 8000 at Joppa; and 10,000 at Damascus.

C. was occupied by the Crusaders; after them, it seems to have gradually decayed into nothingness. It is now a heap of half-buried ruins, with a few miserable stone houses inhabited by fishermen.

CÆSARE'A PHILI'PPI (*Panium*). This town, mentioned in Matt. xvi. 13, was situated about 20 miles north of the sea of Galilee. It was distinguished from the Cæsarea on the coast of Syria by the appendage of "Philippi," given to it in honor of Philip the Tetrarch, who repaired the city. It is now a heap of ruins, overgrown with bushes and grass.

CÆSA'REAN OPERATION (*cædo—cæsus*) has, from very ancient times, been the popular name for *Hysterotomy* (*hystera*, uterus; *tome*, section). Pliny distinctly alludes to it in his "Natural History" (lib. vii. cap. ix.), saying that Cæsar was so called from being taken by excision out of the womb of his mother, and that such persons were called *Cæsones* (Cæsar a cæso matris utero dictus; quâ de causâ *Cæsones* appellati). In his case, the mother must have survived the operation, as Aurelia was alive when her son invaded Britain.

The pages of a popular work scarcely allow of the details of such a proceeding, but we may state that the first incision is made exactly in the middle line of the body, to the length of 6 or 7 inches. When the uterus is exposed, it must be carefully opened, the child lifted out, and then the after-birth. The uterus now contracts, and sinks down into the pelvis, the wound is closed, and opium is given to the patient to allay pain and nervous irritability.

In Great Britain, the C. O. has been rarely performed, most likely from the skill of the accoucheurs rendering such a proceeding unnecessary; but still several cases are on record where not only the child but the mother was saved. Some women, indeed, seem to have accepted it as their usual method of delivery, having several children, each requiring to be removed through an abdominal incision; one woman submitted to it seven times. It has also been successfully performed in most unfavorable circumstances. In the year 1500, a sow-gelder operated successfully on his own wife; an illiterate Irish mid-wife, Mary Donally, operated with a razor on a poor farmer's wife in January 1738, and removed a dead child; her patient completely recovered, so as to be able to walk a mile on the 27th day after the operation. Nay, a negro woman in Jamaica cut herself open with a butcher's knife, removed her infant, and recovered. Practitioners are not quite decided as to the circumstances which justify the performance of this severe operation on the living female, but all agree on the propriety of at once removing by it the child of a recently dead woman. Numa Pompilius decreed that every pregnant woman who died should be opened; and the senate of Venice, in 1608, decreed that practitioners should perform, under heavy penalties, the C. O. on pregnant women supposed to be dead. In 1749, the king of Sicily decreed the punishment of death to medical men who omitted to perform it on women dying when advanced in pregnancy. Of course, to be of any use, it must be performed immediately.

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CÆSIUM. See RUBIDIUM.

CAFFA. See KAFFA.

CA'FFEINE, or Theine ($C_{16}H_{10}O_4N_4,2HO$), is the alkaloid or active principle of Coffee (q. v.) and Tea (q. v.) When isolated, it forms beautiful white crystals, with a silky lustre, which are soluble in water, alcohol, and ether. It is present in coffee to the extent of about 1 per cent., and in ordinary or Chinese tea, from 2½ to 6 per cent, and is also found in Paraguay and Guiana teas. It may be extracted from coffee or tea by making a decoction in hot water, and adding acetate of lead, which causes a precipitate of caffeotannate of lead. When the latter is acted on by sulphuretted hydrogen, the lead is separated, and the C. left in solution. On evaporation of the liquid, and recrystallisation from alcohol, the C. separates in crystals.

CA'FFER BREAD, a name given to several species of *Encephalartos*, trees of the natural order *Cycadaceæ* (q. v.), which, like many others of that order, have much starch in their stems, and afford food to the natives of South Africa. They are also called Bread-trees.

CA'FFERS. See KAFIRS.

CAFFRA'RIA. See KAFFRARIA.

CAFFRISTA'N. See KAFIRISTAN.

CAGAYA'N SOOLOO', an island of the Asiatic Archipelago, in lat. 6° 58' n., and long. 118° 28' e. It is about 20 miles in circumference, well wooded and elevated.—Cagayan is also the name of a province, river, and lake on the island of Luzon, one of the Philippines.

CA'GLIARI, the capital of the island of Sardinia, situated on the side of a hill, on the north-east shore of a spacious bay, and on the south coast of the island, in lat. 39° 13' n., long. 9° 8' e. It has a spacious and safe harbor, defended by several forts and is the emporium of all the trade of the island. The town contains many public buildings and churches, and has a university with 100 students; but its streets, for the most part, are very narrow, steep, and dirty. C. has a pop. of (1872) 32,834. It has also a dockyard, and a good road was some years ago constructed from C. to Sassari, the second city in the island, and to some of the more considerable places. Steamers ply very frequently between C. and Genoa; and it is now united to the continent of Europe by a line of electric telegraph.

CAGLIARI, Paolo, best known as *Paolo Veronese*, an Italian painter of great eminence, was born at Verona in 1532. He first studied under his uncle, Antonio Badile, a respectable artist, and afterwards settled in Venice, where he rapidly acquired both wealth and reputation. He had for contemporaries both Titian and Tintoretto, and was held in equal admiration with these famous painters. The church of San Sebastiano, in Venice, contains many of his productions, which are reckoned the most important of his earlier period—i. e., the period before he visited Rome, when he first became acquainted with the master-pieces of Raphael and Michael Angelo. The influence of the Roman school on his style was so happy, that, on his return, he received the honor of knighthood from the Doge. He died 19th April 1588. C. is remarkable for the fertility of his imagination. His design is generally noble, his composition rich, and his execution truthful. In the invention of details, especially, he is inexhaustible, and often overloads his pictures with ornament. One peculiarity of his works is the frequent introduction of splendid architectural backgrounds, which, however, were generally painted by his brother Benedetto. The most celebrated of his productions is the "Marriage Feast at Cana of Galilee," now in the Louvre at Paris. It is 20 feet high, and 30 in length, and contains 130 figures. Besides these may be mentioned "The Calling of St Andrew to the Apostleship," "The Feast of Simon," and the "Presentation of the Family of Darius to Alexander."

CAGLIOSTRO, Count Alessandro di, a notorious impostor, who, in the latter part of the 18th c., travelled through Europe, and whose adventures afford considerable insight into the social characteristics of his times. He was born at Palermo, of poor parentage, June 2, 1743, and his true name was GIUSEPPE BALSAMO. Carlyle's picture of him when a boy—"brass-faced, vociferous, voracious"—is probably accurate, and already prophesies the bold and boisterous

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quack. When 13 years old, he ran away from the seminary of St Roch, and was afterwards sent to a monastery at Cartagiore. Here he became assistant to the apothecary of the monastery, and picked up that scanty knowledge of chemistry and medicine, which was afterwards found quite sufficient to impose upon so many respectable individuals. His conduct in the monastery was in keeping with his character, but finding it too contracted a sphere for the development of his ambitious genius, he left it, or was ejected, and for a time led "the loosest life" in Palermo. When 26 years old, he found it highly advisable to leave his native place. In company with a certain sage named Althotas, C. is vaguely represented as travelling first in some parts of Greece, Egypt, and Asia. At Rome, "his swart, squat figure first becomes authentically visible in the Corso and Campo Vaccino. He lodges at the sign of the Sun in the Rotunda, and sells etchings there," very hard up at this time. In Venice, "the bull-necked forger" contrived to marry a very pretty woman named Lorenza Feliciana, who became a skilful accomplice in his schemes, and captivated many admirers, while C. picked their pockets. C. now made the tour of Italy with great success as a physician, philosopher, alchemist, free-mason, and necromancer! Next, he extended his victorious career through some parts of Germany, and especially carried on a lively business in his "elixir of immortal youth," which became very popular among the ladies. By virtue of this fine medicine, the count assured his patients that he had already attained his 150th year, while his young and charming wife often talked affectionately of her son as "a commander in the Dutch navy." Through Courland, the count and his accomplice advanced triumphantly to the court of St Petersburg, where he seems to have first made a failure; for the Empress Catharine, aided by her Scotch physician, Rogerson, a keen-witted native of Annandale, who sceptically examined his famous "Spagiric food," and pronounced it "unfit for a dog," penetrated his real character, and made him the subject of a comedy. C. soon found it convenient to vanish. We next find him at Warsaw, discoursing on his pet Egyptian masonry, medical philosophy, and the ignorance of doctors, but he has the misfortune to be unmasked by a certain Count M. This, however, had little effect on the stupid credulity of C.'s dupes—belonging, it must be remembered, to the upper classes, who in that age, according to Carlyle, were at once sensual, infidel, and superstitious—so that they persisted for a time in "distending his pockets with ducats and diamonds," which, however, his lavish dissipation soon scattered to the winds—for this prophet of a new physical and moral regeneration, and inventor of an "invaluable pentagon for abolishing original sin," was a desperate gambler. In 1870, he went to Strasburg; and soon afterwards we find him in Paris, still founding lodges of "Egyptian free-masons," holding nocturnal meetings for calling "spirits from the vasty deep," &c., and scandalously simulating the character and deeds of a philanthropist. From Paris he came over to England, where he was cordially received by the followers of Swedenborg. On his return to Paris (1785), he became distinguished at court, was intimate with the weak and credulous Cardinal Rohan, and played a prominent part in the affair of the Diamond Necklace (q. v.). This lodged him in the Bastille; but he cleared himself by a statement which gained credit, and, after being liberated, carried on his adventures once more in England, but feebly, the sunshine of success now obviously growing dim: in short, the count, in gloom and foreboding, disappeared from the island. But the market in Germany, too, was closed, a general distrust having been excited by the revelations of one of the count's dupes. Elsewhere, also, these began to fail him. "At Aix, in Savoy, there are baths, but no gudgeons in them;" at Turin, he is ordered off by the king; a similar fate befalls him at Roveredo; at Trent, we catch a glimpse of him, "painting a new hieroglyphic screen," which, however, attracts no more the gaping crowd; lower still, "he pawns diamond buckles;" finally, his wayworn wife—in whom, perhaps because of her womanhood, the enormous lie and quackery first breaks up—"longs to be in Rome by her mother's hearth, by her mother's grave, where so much as the shadow of refuge awaits her." In May 1789, he entered the city; on the 29th December, the Holy Inquisition detected him founding "some feeble ghost of an Egyptian lodge." He was imprisoned, and condemned to death for free-masonry. His sentence was commuted to imprisonment for life in the fortress San Leon, where, in spite of his "elixir of immortal youth," he died, 1795, aged 52 years. His wife ended her days

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in a convent. His "Mémoires Authentiques," posthumously circulated in Paris, were *not* authentic.—See Carlyle's "Miscellaneous Essays," art. Count Cagliostro.

CAGNOLA, Luigi Marchese, a distinguished Italian architect, was born at Milan in 1759—died 1833. Belonging to an ancient and wealthy family, he could afford to follow the bent of his own inclination, and devoted himself earnestly to the study of architecture. His master-works are two triumphal arches. The first is the famous *Arco della Pace*, in Milan, commenced in 1807, but not finished until 1838. It is constructed of white marble, and, with the exception of the *Arc de l'Etoile*, in Paris, is both the largest and noblest structure of the kind in Europe, reaching a height of 78 feet. On the top of the arch is a bronze figure of Peace, in a car drawn by six horses, while the sides are richly adorned with innumerable bas-reliefs. The second forming the *Porta di Marenga*, or *Porta Ticinense*, is also a work of great beauty, and is much admired. Besides these may be mentioned the *Campanile* (Bell-tower) at Urguano, in the Bergamese.

CAGOTS is the name given to a tribe of men, of manners and customs akin to those of the gipsies, who are found scattered through various parts of Bearn and Gascony, in France. They are usually thought to be the descendants of the Visigoths, who remained in France after their defeat by Clovis, in the 5th century. Until the French Revolution of 1790, they received even worse treatment than that which generally falls to the lot of the remnants of conquered races. They were forced to wear a peculiar dress, were forbidden to practice all but the most menial trades, and were obliged to live isolated, either in separate villages or in separate quarters of the towns. So complete was their estrangement from the other inhabitants, that they were forced to enter the churches by doors specially set apart for them. Since that Revolution, they have been placed, as regards the law, on an equal footing with other citizens, but socially they are still regarded as a degraded race. Their language has been, so far back as is known, a corrupt dialect of that spoken in the surrounding country; but their blue eyes, fair hair, and fair complexion, mark them out as ethnologically distinct, and speak to a Teutonic origin. From a great liability to the diseases afflicting cretins, probably caused by their exposed manner of life and insufficient nourishment, they were at one time erroneously thought to belong to that unfortunate class. Tribes, whose history and present condition greatly resemble those of the C., are to be found in Brittany, where they received the name of "Caquenx;" and in Poitou, Maine, and Anjou, where they receive the name of "Colliberts." See Michel's "Histoire des Races Maudites de la France et de l'Espagne" (History of Outcast Races in France and Spain), Par. 1847.

CAGSAWA, a town near the southern extremity of the island of Luzon, Philippines, with a population of about 13,000.

CAHETÉ, or CAETE, a small town of Brazil, in the province of Minas Geraes about 250 miles north of Rio de Janeiro. The town is tolerably built, has some churches, a hospital, primary school, electoral college. Agriculture and mining are carried on. Pop. about 6000.

CAHIR, a town in the county of Tipperary, Ireland, on the Suir, beautifully situated at the east end of a valley between the Galtees and Knockmeledown Mountains, 8 miles north-west of Clonmel. In the town is the seat of the Earl of Glengall, with a park which extends along the river for two miles below the town. Cahir Castle, an ancient irregular Norman structure of considerable extent, is situated on a rock on the left bank of the Suir. It was taken by the Earl of Essex in 1599, and by Cromwell in 1650: it has been lately restored. C. has extensive flour-mills, and a pop. of (1871) 2694. Their are large barracks near Cahir.

CAHORS (anciently, *Divona*), a town in the department of Lot, France, is situated on a small rocky peninsula, formed by a bend of the river Lot—here crossed by three bridges—about 60 miles north of Toulouse. The streets of C. are steep and narrow, and present many specimens of antique architecture. It has a fine cathedral, and several Roman remains, including those of a magnificent aqueduct. There is an obelisk to Fénélon, who was a student at the university here. The town was taken and pillaged by Henri of Navarre in 1580. It has manufactures of cotton-

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yarn, woollens, leather, paper, glass, &c.; the district produces wine in considerable quantities. The population in 1872 was 11,416.

CAI'COS, or Cay'os, or Keys, a term applied to numberless rocky islets of the West Indies, and that generally with a reference to some more considerable island in the neighborhood. Thus, to take the Bahamas as an instance, there are the Keys of Providence, of Eleuthera, of Abaco, &c. But more specifically the name is often appropriated to the more southerly members of the group just mentioned—North, West, East, Grand, and other Keys together covering about 450 square miles, and containing about 5000 inhabitants. They lie between 21° and 22° n. lat., having been transferred, with a local president, from the government of Bahama to that of Jamaica. The revenue is about £8000. The imports are valued at nearly £30,000; and the exports (consisting chiefly of salt) at £25,000.

CAI'FA, or Hai'fa, a seaport on the coast of Syria, situated exactly opposite Acre, upon a spur of Mount Carmel, and on the south side of a wide semicircular bay, four miles across. It is the ancient Hefa, or Sycaminopolis. It covers but a small space of ground, and contains no edifice of any note except a few minarets. The houses are built of rough unhewn sandstone, plastered over with lime—the roofs flat. Pop. about 2000—Moslems, Christians, and Jews. C., having a better anchorage than Acre, is fast eclipsing that city as a port, and in recent years almost all the trade of Acre has been transferred to it. Consular agents from England, France, &c., have, within twenty years, been established at C.; and among other improvements are a coffee-house and billiard-room, things rare in Syria. Several cargoes of barley, wheat, and sesame seed are yearly shipped at C., and exported to Great Britain and France. C. is surrounded by beautiful gardens of palm, olive, orange, citron, fig, mulberry, and pomegranate trees.

CAILLIÉ, René or Auguste, a French traveller, noted for his journey to Timbuktu, was born 19th September 1799, at Mauzé, in the department of Deux-Sèvres. Having gone to Senegal, and engaged in trading with the natives, he learned, about 1826, that the Geographical Society of Paris had offered a premium of 10,000 francs to the first traveller who should reach Timbuktu. Provided with a stock of goods for barter, C. started from Sierra Leone, March 22, 1827, and after some delay caused by illness, he reached the mysterious city in April 1828, where he remained 14 days. On leaving Timbuktu, he accompanied a caravan across the Sahara Desert, reaching the coast at Tangier. After hearing and examining his statements, the Society awarded to him the offered prize, with a pension of 1000 francs, and the order of the Legion of Honor. His notes of travel, arranged by M. Jombard, were published under the title "Journal d'un Voyage à Tembouktou et à Jenné dans l'Afrique Centrale, &c." (3 vols., Par. 1830). In England, doubts were raised as to the veracity of C., but without just grounds. C. died at his estate, in the neighborhood of Paris, May 25, 1838.

CAIN, the first-born of Adam and Eve. His history, as recorded in the book of Genesis, is mysterious and inexplicable, and the traditions which a later superstition has gathered round it, have thrown no light whatever on its dark perplexity. As the first murderer, his memory has always been profoundly execrated by the Christian Church; yet such is the perversity of human nature, that one sect—if not more of the pseudo-Gnostics found his actions and character so much to their liking, that they called themselves *Cainites* (130 A. D.), and invented an explanation of his alleged crime, which, like most of the Gnostic heresies in the early church, sprang out of the deep-rooted fundamental error of the "two principles." The Cainites believed that C. was the offspring of the intercourse of a superior Power with Eve, and Abel of an inferior Power; that their characters corresponded to their paternal parentage, and that the slaying of Abel only symbolised the victory of the superior over the inferior Power. The subsequent punishments of C. were regarded as the persecutions of Abel's father—i. e., the Jewish God. For the same reason, they highly honored all the reprobates of the Old Testament—such as the people of Sodom, Esau, Korah, Dathan, and Abiram—whom they looked upon as the victims of the hatred of Jehovah. It is unfortunate that we possess only distorted and fragmentary accounts of this, as of all the other heretical sects. The Cainites are also said to have denied the dogma of the resurrection of the body, to

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have rejected the New Testament, and accepted a gospel of Judas, the betrayer, whom they also reverenced for the singular reason that his crime, by procuring the death of Christ, secured the salvation of men.

CAINOZOIC (Gr. "recent life"). a geological term, synonymous with Tertiary, introduced with other words by Mr Phillips, to avoid the confusion which attended the use of the terms primary, secondary, and tertiary, owing to the various meanings attached to them by geologists.

ÇA IRA (French for "It will go on!"), the well-known refrain of the song beginning with—

"Ah, ça ira, ça ira, ça ira!
Les aristocrates à la lanterne!"

which must always be remembered as associated with the most terrible scenes of the French Revolution. Like the "Marseillaise," the "Carmagnole," and the "Chant du Départ," it became a French national song, and was styled the "Carillon National." The melody, taken from another song, is said to have been a favorite air with the unhappy Marie Antoinette.

CAIRD, Rev. John, D.D., a minister of the Established Church of Scotland, and one of the most eloquent living preachers in Great Britain, was born at Greenock in 1820. He studied at the university of Glasgow, and in 1845 was ordained to the pastorate of the church of Newton-upon-Ayr, whence in 1847 he was translated to Lady Yester's, Edinburgh. Here his popularity was extraordinary, but the demands made on his physical energies were so great, that he found it necessary to retire to the country, and accepted, in 1849, the country charge of Errol, in Perthshire. A sermon which he preached before the Queen in 1855, in the church of Crathie, and which was published, by royal command, under the title of "The Religion of Common Life," was universally admired throughout Great Britain; translated on the continent under the auspices of Chevalier Bunsen, who wrote a preface to it, and suddenly carried the fame of the author into all parts of the Protestant world. In 1857 Dr C. accepted a call to Glasgow. In 1858, he published a volume of sermons, marked by beauty of language, strength of thought, and earnest sympathy with mankind. He received the degree of D.D. in 1860. In 1862, he was appointed Professor of Divinity, and in 1873, Principal of Glasgow University. In 1874 he published "The Universal Religion," a lecture delivered in Westminster Abbey.

CAIRN, or Carn, a Celtic word signifying a protuberance, a heap, a pile. In that sense, it appears in the names of hills and other natural objects in Scotland, Ireland, Wales, Cornwall, and Brittany. It is also applied to artificial heaps of unhewn stones, which, among archæologists, have come to be generally known as "cairns."

There are several kinds of cairns. The simplest and most common form seems to be a conical pile of stones of no great size. Next is what may be called the fenced or ringed C.—a heap of stones girdled round by large unhewn stones set upright in the ground. Some cairns have two, and a very few have three such concentric girdles; in some instances, there are concentric rows of upright stones within the cairn. Many cairns are found in the neighborhood of the circles of unhewn stone pillars which antiquaries used to style "Druidical." In a few instances, cairns are found at the end of an avenue of standing stones. Some cairns are fenced round by a narrow ditch and a small earthen rampart. A very few cairns have unhewn flat stones on their tops; a still smaller number are surmounted by an unhewn stone pillar. A few are oblong in shape.

Cairns were erected, doubtless, for several purposes. It appears from record that they were often raised to distinguished the marches or boundaries of lands. One C. near Balmoral, on the Highland Dee, is said to have been erected as a mustering-place for the men of Strathdee, who took its name, *Cairn-na-cuimhne*, or "C. of Remembrance," for their slogan or war-cry. In later times, places where great crimes had been committed were marked by cairns; thus, "Mushet's C.," in the Queen's Park at Edinburgh, shews the spot where a wife was murdered by her husband, under circumstances of peculiar atrocity, in 1720. But that the great purpose of the C. was sepulchral, is shewn by the human remains found in so

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many of them. "*Dejectis et erutis, ossa inveniuntur, et quibusdam honos nominis adhuc manet,*" says Robert Gordon of Straloch, writing of Scotch cairns in 1654. "For the cairns or heaps of stones in several parts of Ireland," wrote Thady O'Roddy in 1617, "some of them were heaped as monuments of battles, some made in memory of some eminent persons buried in such a place." A Highland suppliant would have said to his benefactor: *Curri mi cloch er do charne*, "I will add a stone to our cairn." The bones found in cairns are generally calcined or half-burned, and enclosed either in what are called *cists*—small rude coffins of unhewn stones—or in urns of earthenware, which, again, are in many cases protected by stone cists. Along with the bones are often found flint arrow-heads, flint axe-heads, stone hammers, stone rings, glass beads, implements of bone, bones of horses and oxen, spear-heads, and other weapons of bronze. In some instances, human bones are found unburned, enclosed in stone cists about three feet long, or, more rarely, of the full size of a man. In one case, as many as seventeen stone cists were found in one cairn.

Many cairns are of considerable size. Each of three cairns at Memsie, near Fraserburgh, in Aberdeenshire, was about 300 feet in circumference, and about 40 feet high. A C. in the parish of Minnigaff, in Galloway, was 891 feet in circumference. Several of the larger cairns are what is called "chambered"—that is, have internal galleries or cells. Of three large ringed cairns at Clava, on the banks of the Nairn river, near the battle-field of Culloden, one was found to contain a gallery, about 2 feet wide, leading from the south side of the C. to a circular chamber in the centre, about 15 feet in diameter, built of unhewn and uncemented stones, each course overlapping the other so as to meet at the top in that sort of rude dome which has received the name of the "beehive house" (q. v.). The Boss C., on the moor of Dranandow, in the parish of Minnigaff, had two galleries crossing each other—each 80 feet long, 4 feet wide, and 8 feet high.

But of all the "chambered" cairns, the most remarkable is that at New Grange, on the banks of the Boyne, near Drogheda, in Ireland. It is 400 paces in circumference, and about 80 feet high, and is supposed to contain 180,000 tons of stones. In 1699, it was described by Edward Lhwyd, the Welsh antiquary, as "a mount or barrow, of very considerable height, encompassed with vast stones, pitched on end, round the bottom of it, and having another, lesser, standing on the top." This last pillar has disappeared; of the outer ring of pillars, ten still remain, placed at about ten yards one from another. "The cairn," says Mr Wakeman, in his "Archæologia Hibernica" (Dublin, 1848), "in its present ruinous condition, presents the appearance of a grassy hill, partially wooded; but, upon examination, the coating of earth is found to be altogether superficial, and in several places the stones, of which the hill is entirely composed, are laid bare. The opening [which is nearly square, and lined by large flags] was accidentally discovered about the year 1699. The gallery, of which it is the external entrance, communicates with a [dome-roofed] chamber or cave, nearly in the centre of the mound. This gallery, which measures in length about 50 feet, is, at its entrance, 4 feet high; in breadth about 3 feet. Towards the interior, its size gradually increases; and its height, where it forms the chamber, is 18 feet. The chamber is cruciform, the head and arms of the cross being formed by three recesses—each containing a basin of granite. The sides of these recesses are composed of immense blocks of stone, several of which bear a great variety of carving, supposed by some to be symbolical. The majority of these carvings must have been executed before the stones had been placed in their present positions. The length of the passage and chamber from north to south is 75 feet, and the breadth of the chamber from east to west 20 feet. Of the urns or basins in the recesses, that to the east is the most remarkable. It is formed of a block of granite, and appears to have been set upon, or rather within, another of somewhat larger dimensions." The Irish antiquaries believe that the chambered C. of New Grange—"the Cave of Achadh Aldai," as it was called, from Aldai, the ancestor of the Tuatha De Danaan kings—was opened and rifled by the Norsemen in 862. About a mile from it, on either side, are other two cairns of nearly equal size, named Knowth and Dowth. The latter was opened in 1847, and found to contain a gallery, a cruciform chamber, a basin or sarcophagus, and carved stones, all of the same type as those of New Grange. Engravings of the sculptures, in both cairns, are given in Mr W. R. Wilde's "Boyne and Blackwater," pp

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192—207 (Dublin, 1850), and some of them are obviously of the same character with sculptures found in Scandinavia; at Locmariaker, and at Gavr Innis, in the Morbihan, in Britanny; in one of the cells of a tumulus opened in 1853 at Pickaquoy, near Kirkwall, in Orkney; among the ruins of an ancient fort at the Laws, near Dundee; at the ancient forts at Rowtin Lynn, and Old Bewick in Northumberland; and on one of the standing stones near Penrith in Cumberland, called "Long Meg and her Daughters."

Cairns are most frequent in stony countries. Where, as in many parts of England, stones are scarce, the barrow or earthen mound came in place of the C., from which it differs only in the materials of which it is made. So also in Scandinavia. Cairns, or *dysser*, as they are there called, are rare in Denmark, but of more common occurrence in Sweden and Norway.

CAIRNGO'RM STONE, or simply Cairngorm, a name often given by jewellers, and particularly in Scotland, to brown or yellow quartz or rock-crystal, because found at Cairngorm, in Aberdeenshire. The same mineral is found in many other localities, as at Olivet near Orleans, in Brazil, and in Siberia. In Cairngorm and the neighboring district of Mar, it occurs both in the granite rock and in the alluvial soil. It differs from common colorless quartz or rock-crystal only in the presence of a very little oxide of iron or manganese, to which it owes its color. It is much used as an ornamental stone. The yellow variety is not unfrequently called topaz, although quite different from the true topaz, which it resembles chiefly in color, having neither its hardness nor its brilliancy. The topaz is, however, sometimes found along with it in the granite and gneiss districts of Mar and Cairngorm. The brown variety is sometimes called SMOKY QUARTZ, and when of a good and uniform color is by some preferred to the yellow.

CAI'RO (Arabic, *Musr el Kahirah*, "the victorious capital"), the capital of modern Egypt, is situated in lat. 30° 2′ n., and long. 31° 16′ e., in a sandy plain betwixt the right bank of the Nile and the ridge of Mokattam, and near the point of the delta of the Nile. From the foundation of the city in 969, the Fatimite califs of Africa, who brought the bones of their ancestors with them from Kairon, reigned for ten generations over the land of Egypt. The calif Hakem, who built a mosque near Bab-el-Naser, and who is the supposed founder of the Druse religion, was the third in this succession. In the year 1171, Saladin usurped the throne from the last of the Fatimites. His descendant, Moosa-el-Ashref, was deposed in his turn in 1250; from that time till the year 1517, when the city was stormed and taken by Sultan Selim, C. was governed by a succession of Mameluke kings.

The city of C. occupies about three square miles, and is surrounded by a low wall. Of late years it has been greatly improved. It is lighted with gas, and many fine broad streets have been opened through the crowded districts. The bazaars are well and richly supplied. The houses, which are generally two or three stories high, are all built of variegated brick, with interlinings of wood, and have flat roofs. The city is divided into different quarters, one quarter being appropriated to the Turks, one to the Christians, one to the Jews, &c.; so that every religious sect has its own quarter, which is separated from the adjoining one by strong gates at the end of the streets; these are closed at night, and guarded by a porter, who opens the gate when any one wants to pass.

The most remarkable buildings in the city of C. are its minarets and mosques. The minarets are the most beautiful of any in the Levant, of a prodigious height, and built of alternate layers of red and white stone. The most ancient of all the minarets is that attached to the great mosque of Sultan Tayloon. This mosque was built in the year of the Hegira 265 (879 A. D.), before the foundation of the city, and consists of an immense cloister or arcade built on pointed arches, being the earliest extant in that form. Another magnificent mosque is that of the Sultan Hassan, situated in the place of the Roumayll, near the citadel, and which was finished about the year 1362 A. D. It has two very elegant and high minarets, and the mosque, in consequence of its size, and the thickness of its walls, was frequently seized and made use of as a fortress by the insurgents in the numerous rebellions and insurrections which were always taking place at C. under the rule of the Mameluke kings. Stains of blood are still to be traced on the marble walls of the courtyard.

The population of C. consists of the ruling class, who are all Turks; Arabs, the former conquerors of the land, who form the bulk of the population, all the petty

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tradesmen and cultivators of the soil being of Arab origin; Copts, who are descended from the original lords of the land, the ancient Egytians; Jews, Armenians, Syrians, Africans, and Europeans. Pop. (1872) 350,000. The Copts, a mere fraction of the population, completed, in 1867, a fine, lofty, spacious church. Since 1863 the part of C. occupied by Europeans has been handsomely rebuilt. In 1876, C. was connected by rail with Heluan, one of the numerous bathing-places lying to the south.

Of objects worthy of note in the environs of C., there may be mentioned the tombs of the califfs, situated about a mile beyond the walls, which are magnificent and imposing buildings, forming beautiful specimens of Arabian architecture. The mausoleum of Sultan Bergook is a triumph of Saracenic architecture. The public gardens, which consist of groves of orange, citron, palms, and vines, are very beautiful. The trade of C. is rapidly increasing. The exports consist mainly of native products, such as ivory, gum, wood, hides, ostrich feathers, cotton and sugar; while the imports are cotton and woollen goods, prints, hardware, cloth, furniture, shawls, indigo, sheep, tobacco, &c. In 1873, about 120,000 lbs. of ivory were exported. C. is the seat of learning for the East, and has of late years made great advances in education. In 1872, the government colleges had 1025 students and 141 teachers, and the national schools were attended by 4121 pupils; while 6774 attended the theological university attached to the mosque of Ezher. The schools comprise a commercial and juridical school at the Darb Algamâmiz, a school of arts and industry at Boolak (q. v.), and military schools at the Abbasseeyah. The language spoken at C. is Arabic, which, though not the purest, is superior in pronunciation to that spoken in Syria. C. is the official residence of the viceroy of Egypt, and the residence of a consul-general from Great Britain, France, &c. C. has railway connection with Alexandria and Suez, and there is also a line to Upper Egypt.

CAISSO'N, in military matters, is a name sometimes given to a tumbril or ammunition wagon. It is more frequently applied, however, to a large wooden chest or frame, loaded with powder, shells, or both, and buried several feet deep in the ground under some fortification; this destructive combination is to be blown up if there be danger of the enemy approaching and taking possession of that particular part of the defence-work. The French give the name of *caisson pour les vivres* to a large chest, carried with the army, and capable of containing 800 rations.

CAISSON, in relation to shipping, is an apparatus for lifting a vessel out of the water for repairs or inspection. It is usually a hollow structure, sunk by letting water into it. There is an air-chamber inside, which allows it to sink only to a certain depth. In that state it is hauled under the ship's bottom, the traps or openings are closed, the water is pumped out, and the caisson rises with the ship upon it.

In another arrangement, a platform is sunk to a certain depth in the water, and is suspended by iron screws from a strong wooden framework; the ship is floated upon the platform, steadied by shores, and lifted high and dry by means of levers, wheels, pinions, and screws.

CAITHNESS, a maritime county, the most northerly on the mainland of Scotland. It is triangular in shape; length from north to south, 40 miles; greatest breadth, 30 miles; area, 712 square miles. Except in the west and south, where the mountain-range (composed of granite and gneiss) dividing C. from Sutherland, attains, in its highest point, a height of more than 2300 feet. The general aspect of C. is level and bare, being in great part moorland and destitute of trees, while the sea-coast is bold and rocky, with many bays, inlets, promontories, and caves. On the north coast are Dunnet Head and Duncansby Head; and on the west side of the last-named head is a spot of green turf, called John o' Groat's House, where John de Groot or Groat of Warse settled with his brothers in James IV.'s time, and built a house. There are no navigable rivers in C., and no lakes of importance. The climate is damp and chilly, but snow rarely lies on the plains above a day or two at a time. Thunder is rare, but auroræ are seen almost nightly. There are no manufactures, properly so called, although weaving is carried on to some extent. Coal has not been found in C.; the common fuel is peat. The chief crops are oats, bear, turnips, and potatoes. The parts of the surface under tillage are generally a deep fertile loam on a strong till clay. In the north-east, the soil is sandy. The crops are 20 days later in ripening than in the Lothians. The occupants of many of

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the small farms divide their time between farming and fishing. There are herring, ling, cod, salmon, and lobster fisheries. The herring-fishery in July and August employs about 1500 boats, a part of which come from other parts of the Scotch coasts. Wick is the chief seat of the British herring-fishery. The average number of barrels cured annually in the ports of C. may be stated at 200,000. The other exports are cattle, oats, wool, and flag-stones, of which, as well as of free-stone and slate, C. contains quarries. Wick is the only parliamentary borough in C.; another town is Thurso, an old burgh of barony. There were, when the census was taken in 1871, 7185 children in C., and of these, 6608 were receiving education. Pop. 39,992. The county returns one member to parliament, and Wick unites with Kirkwall, Dornoch, Dingwall, Tain, and Cromarty, in returning another. A railway, completed in 1874, and extending to Wick and Thurso, connects C. with the south. In early times, C. is supposed to have been inhabited by Celts; these afterwards mixed with Danes and Norwegians. C., in the middle ages, was subject to the kings of Norway. David II. adopted the weights and measures of C. for all Scotland. The Scandinavian origin or mixture of the people of C. is shewn by their tall forms and soft fair features, and their speaking English instead of Gaelic. C. has remains of Picts' houses, round towers, &c.

CAITHNESS FLAGSTONES are dark-colored bituminous schists, slightly micaceous and calcareous, valuable on account of their great toughness and durability for pavements, cisterns, and various other purposes, and accordingly are largely exported. They belong to the Old Red Sandstone, and contain abundant remains of fossil fishes.

CAIUS, Dr John, the person from whom Caius College, Cambridge, takes its name, was born at Norwich in 1510. His real name was Kaye or Key, which he Latinised into Caius. He was educated at Gonville Hall, university of Cambridge; and at the age of 20, turned into English Chrysostom's "Method of Praying to God," which was followed by a translation of Erasmus "On True Theology." He next went abroad, and resided in Italy for several years, studying medicine. On his return to England, he practised with success at Cambridge, Shrewsbury, and Norwich. Henry VIII. appointed him anatomical lecturer to the Company of Surgeons in London. In 1547 he was elected a fellow of the College of Physicians, of which he was subsequently made president. He also became physician to Edward VI., Queen Mary, and Queen Elizabeth. In 1557, he obtained permission to elevate Gonville Hall into a college, which took the name of Caius College, and of which he became master. This office he held till his death, in July 1573. His principal work is, "A Boke or Counseill against the Disease commonly called the Sweate or Sweatyng Sicknesse. Anno Do. 1552." C., however, wrote a great number of works on a variety of subjects, critical, antiquarian, and scientific.

CAIUS COLLEGE. See GONVILLE AND CAIUS COLLEGE.

CAIVA'NO, a town of Southern Italy, in the province of Naples, and 8 miles north of the city of that name. It was a place of considerable strength in the middle ages, and still retains many remains of its walls and towers, though they have suffered severely in the various revolutions of Naples. Pop. 10,000.

CA'JEPUT (*Melaleuca Cajeputi* or *M. minor*), a tree of the natural order *Myrtaceæ*, sub-order *Leptospermeæ*, from the leaves of which the pungent, aromatic, volatile oil, called *Oil of Cajeput*, is obtained by distillation. The C. tree is common on the mountains of the Moluccas. It is rather a small tree, with a crooked trunk, thick spongy bark, white wood (whence the name C., properly *kayuputi*, signifying white wood), elliptical-lanceolate alternate leaves, and terminal spikes of white flowers. The greater number of the species are natives of Australia, some of them very beautiful shrubs and frequent ornaments of British hot-houses. Much of the oil of C. of commerce is prepared in the island of Banda. It is said that two sackfuls of leaves yield scarcely three drachms of the oil, which is green, transparent, limpid, with a strong penetrating odor, and agreeable only when much diffused.

CA'LABA TREE. See CALOPHYLLUM.

CALABA'R, the name of a coast district of Upper Guinea, Africa, the limits of which are not clearly defined; but it is usually understood to extend between the river Benin and New Calabar, called by the Portuguese Rio del Rey, and as far north

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as the Kong Mountains. The surface is low and flat, and the climate unhealthy. Yams, which are the principal food of the inhabitants, are raised in plenty, and also the sugar-cane, and palms, from which palm-oil is obtained in large quantities. The inhabitants are polygamists, and make human sacrifices to good and evil spirits. The United Presbyterians have had a mission here since 1846, which is beginning to produce beneficial changes.

CALABAR (Old), a river of this district, enters the Bight of Biafra, about 52 miles west-north-west of Fernando Po, by an estuary about 9 miles in breadth. It is navigable by steamers for about 200 miles above its mouth, and abounds in crocodiles. The chief towns on its banks are—Duke Town, situated on its estuary; Creek Town, further up, both seats of British missions; Acoono Coono, and Omun.—CALABAR (New), a branch of the Niger, falling into the Bight of Biafra, in lat. 4° 30′ n., and long. 7° 7′ e. It has a bar across its mouth, which prevents the entrance of vessels drawing more than 12 feet; but some miles up it has an average depth of 30 feet.

CALABAR BEAN, a very remarkable medicinal agent, which has been introduced into the new edition of the British Pharmacopœia (1867). It is the seed of *Physostigma venenosum*, a twining, half-shrubby plant, a native of Western Africa, of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, nearly allied to the kidney bean, but of a genus distinguished by the hood-shaped stigma, and the deeply-furrowed hilum of the seed. The following are the leading characters of the bean itself: "About the size of a very large horse-bean, with a very firm, hard, brittle, shining integument, of a brownish-red, pale chocolate, or ash-gray color. Irregularly kidney-shaped, with two flat sides, and a furrow running longitudinally along its convex margin, ending in an aperture near one end of the seed. Within the shell is a kernel, consisting of two cotyledons, weighing on an average about 46 grains, hard, white, and pulverisable, of a taste like that of the ordinary edible leguminous seeds, without bitterness, acrimony, or aromatic flavor. It yields its virtues to alcohol, and imperfectly to water." It is used in the form of an emulsion by the natives of Africa, as an ordeal when persons are suspected of witchcraft. About twenty years ago, Dr Christison very nearly fell a victim to his zeal for science in experimenting on some specimens of this bean which had been sent to Edinburgh by some African missionaries, dangerous symptoms having been produced by 12 grains of the kernel which he swallowed. In 1861, Dr Thomas R. Fraser tried the effects upon himself of doses of 6, 8, and 10 grains. The general symptoms were epigastric uneasiness, great feebleness, dimness of vision, salivation, giddiness, and irregular, feeble, and slow heart's action. About the same time, he made the interesting discovery, that when placed on the eyeball this substance contracts the pupil, and produces near-sightedness; and it is now frequently employed for these purposes by ophthalmic surgeons. In 1864, 50 children were poisoned by eating these beans, which were swept out of a ship at Liverpool. A boy aged six years, who ate six beans, died very rapidly. The chief symptoms in these cases were griping, vomiting, and contracted pupils; the face was pale, the eyes bright and protruding, and in trying to walk, the children staggered as if they were drunk. Dr Fraser, in a paper which he communicated to the Royal Society of Edinburgh in 1866, maintains that, in mammals, death is generally produced by a combination of syncope (faintness) with asphyxia (suffocation); the symptoms of the one or the other depending on the dose, which, when large, at once destroys the heart's action. It has been used medicinally in small doses (one to ten grains of the powder, or $\frac{1}{16}$ to $\frac{1}{4}$d of a grain of the extract) in chorea, tetanus, general paralysis of the insane, and other diseases of the nervous system. Being now a recognised medicinal agent, it is satisfactory to know that the dangerous and even fatal effects of excessive doses may be prevented by administering belladonna (night-shade), or its active principle, atropia, as a counter-poison. This fact has been established by Dr Fraser in a communication to the Royal Society of Edinburgh, embracing the results of 500 experiments on dogs and rabbits. So unmistakable is the power of the antidote, that it can prevent even three times a fatal dose of the kernel from causing death in those animals. Belladonna has also an opposite action on the eye to that of this substance, as it dilates the pupils and produces long-sightedness. When the pupil is contracted by Calabar bean, it may be dilated to its normal, or to a greater, size by belladonna;

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and when it is dilated by belladonna, it may be reduced to its normal, or to a less, size by Calabar bean.

CALABASH TREE (*Crescentia Cujete*), a tree found in the West Indies and in the tropical parts of America, of the natural order *Bignoniaceæ* (q. v.), suborder *Crescentiaceæ*. In height and size it resembles an apple-tree, and has wedge-shaped leaves, large whitish fleshy flowers scattered over the trunk and older branches, and a gourd-like fruit, sometimes a foot in diameter. The wood of the tree is tough and flexible, and is well adapted for coach-making. But the most useful part is the hard shell of the fruit, which, under the name of *calabash*, is much used in place of bottles for holding liquids, and for goblets, cups, water-cans, &c. These shells may even be used as kettles for boiling liquids, and they will bear this several times without being destroyed. They are sometimes highly polished, carved with figures, tinged with various colors, and converted into ornamental vessels. The rinds of gourds are sometimes similarly used, and called calabashes.

CALA'BRIA, the south-west peninsula of the kingdom of Italy, bounded north by the province of Basilicata. Its greatest length, from the southern border of Basilicata to Cape Spartivento, is about 160 miles. In its northern part it has a breadth in some places of more than 60 miles, which suddenly contracts, between the Gulfs of Sant' Eufemia and Squillace, to not more than 16. Its entire area is nearly 7000 square miles, and its population, in 1871, amounted to 1,206,302. It is traversed throughout its entire length by the Apennine Mountains (q. v.), whose summits in the region in the north of C., known as La Sila, and the Aspromonte, in the south, are crowned with pines, while forests of oak and beech cover their sides. The valleys between the various hills afford rich pasture, especially in the north, to which, in spring-time, whole colonies migrate with their flocks and herds. There is no river of any importance in C.; but the valleys and plains, watered by such streams as there are, are very fertile, yielding wheat, rice, cotton, liquorice, saffron, the sugar-cane, &c., and also the vine, orange, lemon, olive, fig, and mulberry, in luxuriance. Iron, alabaster, marble, gypsum, and antimony, are among its minerals. The fisheries of its coasts, particularly the tunny and anchovy fisheries, are important, and afford employment to a large number of the population. Manufactures are in a backward state. Silk is the staple article. The district is very subject to earthquakes. For purposes of administration, C. is divided into the provinces of Cosenza, which has a population of 440,468—capital, Cosenza; Catanzaro, with a population of 412,226—capital, Catanzaro; and Reggio, with a population of 353,608—capital, Reggio.

In ancient times, the name C. was given to the south-east peninsula, nearly corresponding to the modern province of Lecce, no portion of which is included in modern C., which answers to the ancient *Bruttium*. The name C., as applied to the district now known by that name, appears to have originated with the Byzantines sometime prior to the conquest of the country by the Normans. A colony of the Vaudois or Waldenses of Piedmont was founded in C. in 1340, and for some time enjoyed great prosperity, but was extirpated in 1560—1561. The destruction of this colony is one of the blackest passages of the history of religion in Italy.

The Calabrians are a proud, fiery, and revengeful race. They were long celebrated as among the fiercest of banditti; but the crimes which in former times made them infamous are no longer frequent. They strenuously resisted the power of France during the Napoleonic campaigns, and were not finally subdued until 1810.

CALA'DIUM. See Cocco.

CALAHO'RRA, a town of Spain in the province of Logrofio, 24 miles south-east of the city of that name, is situated on the small river Cidacos, about 2 miles from its confluence with the Ebro. C. occupies the site of the ancient *Calagurris*, celebrated in classic history for the obstinate but unsuccessful resistance it offered (78 B. C.) to Afranius, Pompey's legate, when the citizens slaughtered their wives and children for food rather than surrender. C. was the birthplace of Quintilian the rhetorician. It has an old cathedral, and a trade in the agricultural produce of the rich district in which it is situated. Pop. about 7000.

CALAIS, a seaport town of France, in the department of Pas-de-Calais, on the

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Strait of Dover, near its narrowest part, the distance from the town of Dover not being more than 26 miles. The latitude of the new light-house—190 feet in height—is 50° 57′ 45″ n., long. 1° 51′ 18″ e. C. is a fortress of the first class. On the south and east, low marshy grounds, which those in the city have the means of submerging, stretch up almost to the walls, which on the north and west are washed by the sea. The town, adjacent country, and port, are commanded by the citadel, which is situated at the west end of the town, while numerous forts, by their cross-fire, defend the weakest points. The harbor, which is nearly dry at low tide, and which has rarely more than from 15 feet to 18 feet of water in it, is formed by two moles, which project about three-quarters of a mile into the sea. Being one of the chief ports of debarkation for travellers from England to France, it has daily steam communication with Dover—with which it is also connected by submarine telegraph—and with London and Ramsgate several times a week. The city, which is entered from the sea by a drawbridge and gate, erected in 1635 by Cardinal Richelieu, is square in form; its streets are, for the most part, broad and well paved; and its ramparts form pleasant promenades. But it is on the whole a dull place. It has few objects of interest, the most noticeable being the cathedral, with a fine picture of the "Assumption" by Vandyck. It has become a manufacturing town of some importance. The chief manufactures are bobbin-net (tulle) and hosiery. Numerous mills have been built; steam-engines are multiplying; and the inner ramparts have been removed to make room for factories. Hats and gloves are extensively made. It has also distilleries, salt-refineries, and ship-building. C. sends many boats to fish for herring and cod on the coasts of Scotland and Iceland. Water, which used to be scarce, is now brought in abundance from the neighborhood of Guines. Its exports consist of eggs, corn, wine, brandy, &c. In 1875, a school of artillery was established in C. Pop. (1872) 11,534.

In the 9th c., C. was but a small fishing-village. In the following c., it was much improved by Baldwin IV., Count of Flanders and enlarged and strengthened by Philippe of France, Count of Boulogne. After a long siege, it was captured by Edward III. of England, whose hard terms, and the self-devotion shewn by six of the citizens, who were saved by Queen Philippa, form one of the most interesting passages of history. The English retained it until 1558, when it was captured by the Duke of Guise, since which time (with the exception of two years, 1596—1598, when it was in the possession of the Spaniards) it has remained in their hands. In 1659, Charles II. of England resided some time here; and about a quarter of a century later, James II. arrived here with French troops for the invasion of England, which the destruction of the French fleet prevented him from accomplishing. Louis XVIII. landed here in 1814, after his exile.

CALAMANDER WOOD, a cabinet-wood of the greatest value, resembling rose-wood, but much surpassing it in beauty and durability. The tree which produces it is *Diospyros hirsuta* (see DIOSPYROS), a species of the same genus which produces ebony; it has oblong obtuse leaves, which are downy beneath, and flowers without stalks, and crowded; and is a native of the south-east of India, and of Ceylon, particularly of the forests at the base of Adam's Peak. But this tree "has been so prodigally felled, first by the Dutch and afterwards by the English, without any precautions for planting or production, that it has at last become exceedingly rare," so that wood of considerable size is scarcely to be procured at any price. It yields veneers of unusual beauty, "dark wavings and blotches, almost black, being gracefully disposed over a delicate fawn-colored ground." Its density is very great, a cubic foot weighing nearly 60 lbs., and it takes an exquisite polish. The name C. W. is supposed to be a corruption of Coromandel wood.

CA'LAMARY, Squid, or Sleeve-Fish (*Loligo*), a genus of cephalopodous mollusks of the order *Dibranchiata*, and family *Teuthidæ*. The body is of an elongated form, firm, fleshy, tapering, and flanked towards its posterior extremity by two triangular fins. The body contains a *gladius*, or internal shell, which is horny and flexible, narrow and pen-shaped, with the shaft produced in front. The mouth is furnished with eight arms. Calamaries have the power of diffusing a dark-colored fluid around them in the water like the cuttle-fish. The different species are distributed over all parts of the world. Several are found in the British seas. In some seas, however, they abound much more, and form a principal part of the food of

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some of the larger fishes and of whales. The Common C. or Squid (*L. vulgaris*) is of a bluish color, speckled with purple. It grows to nearly a foot and a half in length, without reckoning the head and arms, which add to the length about half a foot more. See CEPHALOPODA.

CALAMIA'NÉS, a group of islands in the Eastern Archipelago, in lat. about 11° 25'—12° 20' n., and long. 120° e. Calamianes, the name of the largest of the group, is about 35 m. long, and 15 m. broad, elevated and fertile, with abundance of animals, such as deer and hogs. The group, with the northern part of Palawan, forms the Spanish province of C., the poorest in the Philippines.

CA'LAMINE. an ore consisting essentially of carbonate of zinc. The name is said to be derived from the Greek and Latin *calamus*, a reed, because when fused it adheres to the base of the furnace in a reed-like form. Its primary form is a rhomboid, and it occurs in small obtuse-edged crystals, also compact and massive. It is white, yellowish-white, brown, green, or gray; is sometimes opaque, sometimes translucent; is brittle, and has an uneven conchoidal fracture. It occurs in beds and veins in rocks of various kinds, but most commonly in limestone. Mendip, Matlock, Alston Moor, Leadhills, and Wanlockhead are British localities. C. is an important ore of zinc. In the duchy of Limburg, in the Netherlands, about 1,500,000 lbs. of it are annually extracted from the mines.

CA'LAMINT (*Calamintha*), a genus of plants of the natural order *Labiatæ*, nearly allied to BALM (q. v.) (*Melissa*). The COMMON C (*C. officinalis*, formerly *Melissa Calamintha*) is not unfrequent in England. It has whorls of flowers (*verticillasters*), on forked many-flowered stalks, and serrated leaves, with an agreeable aromatic odor, not unlike that of some kinds of mint. It is used by the country people to make herb-tea, and as a pectoral medicine.—The LESSER C. (*C. Nepeta*), also an English species, is used in the same way.

CA'LAMITE, a genus of fossil plants whose true position has not been satisfactorily ascertained. They appear first in the Devonian rocks, and rise through the intermediate formations of the Oolitic series, where they are represented by a single species. They reach their culminating point in the Coal measures, where 39 species have been determined. The tall straight stems rose from a swampy clay soil in profusion in the forests of sigillaria, and formed a striking and characteristic feature in the coal flora, though they supplied little material for the structure of coal. They are hollow-jointed cylinders, with longitudinal furrows, giving the fossil the appearance of *Equisetæ*; from this resemblance, botanists have generally considered them as huge "horsetails." Hooker has been unable to detect any traces of structure, in carefully prepared specimens, or the presence of those siliceous stomata which characterise *Equisetæ*, and which would have been preserved in the fossil state, and Fleming has shewn that the furrows are markings on the interior cavity. While, therefore, it is certain that they are not "horsetails," the absence of fructification makes every attempt to give them their position but guess-work. Hooker supposes them nearly allied to Ferns, or Club-mosses; Brongniart ranks them among Gymnospermous Dicotyledons. The upper part of the stem, and the foliage, if any, have not been noticed. The root termination was conical, the joints decreasing downwards in size and length. From the scars on the upper portion of each joint, there proceeded filaments, which were supposed to be leaves, but are really roots.

CA'LAMUS, the reed pen which the ancients used in writing, was made of the stem of a reed growing in marshy places, probably *Arundo Donax* (see REED), of which the best were obtained from Egypt. The stem was first softened, then dried, and cut and split with a knife (*scalprum librarium*), as quill pens are made. To this day, the Orientals generally write with a reed, which the Arabs also call *Kalóm*.

CALAMUS, a genus of palms. See RATTAN and DRAGON'S BLOOD.

CALAMUS, a name sometimes given to the Sweet Flag (*Acorus Calamus*). See ACORUS. See also next article.

CA'LAMUS AROMA'TICUS, the name given by the ancients to a plant to which they ascribed important medicinal virtues. It is by no means ascertained what the plant is: the most probable opinion appears to be that of Dr Royle, who supposes it

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to be one of the sweet-scented grasses which yield the grass oil (q. v.) of India, to which he has given the name of *Andropogon calamus aromaticus*. See LEMON-GRASS. The C. A. of the Greeks and Romans came from the East. The *Sweet Calamus* and *Sweet Cane* mentioned in Scripture (Exod. xxx. 23, and Jer. vi. 20) are probably the same with the calamus aromaticus.

CALAMY, Edmund, an eminent English divine, was born in London, 1600; studied at Pembroke Hall, Cambridge, where he attached himself to the Calvinistic party; and afterwards became domestic chaplain to the Bishop of Ely. In 1636, he was appointed lecturer at Bury St Edmunds, but resigned his office when the order to read the "Book of Sports" began to be enforced. In 1639, he was chosen minister of St Mary's, Aldermanbury, London. He now entered warmly into the controversies of the time, and became noted as a leading man on the side of the Presbyterians. He had a principal share in the composition of "Smectymnus," a work intended as a reply to Bishop Hall's "Divine Right of Episcopacy," and one of the most able and popular polemics of the day. Like the mass of the Presbyterian clergy, he was monarchical and not republican in his political opinions. He disapproved, therefore, of the execution of Charles, and the protectorate of Cromwell, and did not hesitate to avow his attachment to the royal cause. He was one of the deputies appointed to meet Charles II. in Holland, and congratulate him on his restoration. His services were recognised by the offer of a bishopric, which he refused from conscientious scruples. The increasing tyranny and intolerance of the High Church party compelled him to give up even his royal chaplaincy. He died October 29, 1666.—Two of his sons were educated for a religious profession: the one, Dr BENJAMIN C., became a High Churchman, and wrote "A Discourse against a Scrupulous Conscience;" the other, EDMUND C., was ejected for nonconformity, and had a son, also named Edmund, who acquired some reputation as the biographer of the ejected clergy.

CALA'NDO, in Music, an Italian expression, meaning diminishing by degrees from forte to piano; it differs from decrescendo, or diminuendo, as the tempo, at the same time, is slightly retarded, but not so much as in ritardando. The proper performance of the C. is purely a matter of good taste and feeling, depending on the performer.

CALA'NDRA. See CORN WEEVIL.

CALANDRO'NÉ, a wind-instrument used by the Italian peasants, on which they play simple melodies, and also sometimes accompany their national songs. It has the holes of the common flute, but the intonation is produced as in the common pipe.

CALAS, Jean, a Frenchman, remembered as the unhappy victim of fanaticism and the shocking mal-administration of justice, was born at Lacaparède, in Languedoc, March 19, 1698. He lived as a tradesman in Toulouse, where he had a very good reputation. One evening after supper (October 13, 1761), the eldest son of the C. family, Marc Antoine, a youth addicted to gambling, and subject to fits of deep melancholy, was found hanged in the warehouse. There was not a shadow of a reason for doubting that the unhappy young man had committed suicide; but popular rumor accused the father, or other members of the C. family, of murdering the eldest son, "because he had contemplated conversion to Catholicism." It was also asserted that a young man named Lavaysse, who was in the house on the fatal evening, had been despatched "by the Protestants of Guyenne to perpetrate the murder." The clergy exerted all their influence to confirm the populace in their delusion. At Toulouse, the White Penitents celebrated with great solemnity the funeral of the young man, and the Dominican monks erected a scaffold and placed upon it a skeleton, holding in one hand a wreath of palms, and in the other an abjuration of Protestantism. The family of C. was, in consequence of the popular excitement, brought to trial for the murder, and several deluded and (most probably) some bribed witnesses appeared against them. A Catholic servant-maid, and the young man Lavaysse, were also implicated in the accusation. C., in his defence, insisted on his uniform kindness to all his children; reminded the court that he had not only allowed another of his sons to become a Catholic, but had also paid an annual sum for his maintenance since his conversion. He also argued from his own infirmity that he could never have prevailed over a strong young man, and referred to the well-known mel-

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melancholy moods of the deceased as likely to lead to suicide; and, lastly, he pointed out the improbability that the Catholic servant-maid would assist in such a murder. But all his arguments proved unavailing, and the parliament of Toulouse sentenced the wretched man—by a majority of 8 votes against 5—to torture and death on the wheel! With great firmness and protestations of his innocence to the last, the old man died on the wheel, March 9, 1762. His property was confiscated. His youngest son was banished for life from France, but was captured by the monks, and compelled to abjure Protestantism. The daughters were sent to a convent. The young man Lavaysse was acquitted, and the widow of C. escaped into Switzerland, where she was so fortunate as to excite the benevolent interest of Voltaire, who brought the whole affair before the public, and in his book "Sur la Tolérance," proved that C. had fallen a victim to religious hatred and popular fanaticism. A revision of the trial followed, and, after full investigation, the parliament at Paris declared (March 9, 1765) C. and all his family innocent. Louis XV. gave to the bereaved family the sum of 30,000 livres; but, strange to say, neither the parliament of Toulouse not the fanatical monks were ever brought to account for this horrible judicial murder!

CALASCIBE'TTA, or Calatas-cibetta (Saracenic = Castle of Xibeth, or Scibet), a town of Sicily, near its centre, 54 miles south-east of Palermo, in the province of Caltanisetta. The town is mean and dismal looking, and is built on a steep and isolated height, the summit of which is 2570 feet above the sea, and commands a magnificent view. It was founded in 1060. The only object worthy of notice is the tower of the principal church, which is of early architecture. Pop. 5600.

CALASA'YA BARK. See CINCHONA.

CALASIA'O, a town of the island of Luzon (Philippines), with a population of 18,000, who are engaged in the manufacture of straw-hats, cigar-cases, &c.

CALASPA'RRA, a town of Spain, in the province of Murcia, 40 miles north-west of the city of that name. The inhabitants, numbering 5275, are chiefly engaged in agricultural pursuits.

CALATABELLO'TA, a town of Sicily, in the province of Girgenti, and 27 miles north-west of the city of that name. In the immediate vicinity is the site of the ancient *Triocala*, the chief fortress of the insurgents in the second Servile war, 103—100 B. C. Pop. about 6000.

CALATAFI'MI, a town of Sicily, in the province of Trapani, situated 8 m. s.w. of Alcamo, in a very fertile district. It is ill-built, and has a ruinous old Saracenic castle, Kalat-al-Fimi, from which it derives its name. There is a remarkable Mosaic altar in the church of Santa Croce. Here, in 1860, Garibaldi's troops defeated the Neapolitan soldiers. Pop. 9500.

CALATAGIRO'NE, or Caltagiro'ne, a city of Sicily, in the province, and 34 m. s.w. of the city of Catania. It is well built, with wide streets, and has the fame of great wealth. It has manufactures of cotton fabrics and pottery. Pop. (1872) 25,978.

CALATAÑAZO'R, a town of Aragon, Spain, about 10 miles south-west of Soria. It is celebrated for a great victory over the Christians obtained by Al-Mansur in 1001. Pop. 1500.

CALATAYU'D, a city of Aragon, Spain, situated on the Jalon, near its junction with the Jiloca, about 48 miles south-west of Saragossa. It is built at the base of two rocky ridges, and out of the ruins of ancient *Bilbilis*, which lay about 2 miles to the east. The city is divided into a new and old portion, the former of which is composed of mean old buildings. The latter has some good streets and handsome squares. C. has a noble old castle, and among its other most noteworthy public edifices are the two collegiate churches and the Dominican convent. In the neighborhood are some curious stalactitical caves. It has manufactures of linen and hempen fabrics, woollens, paper, leather, &c., and a trade in agricultural produce. Pop. 11,037.

CALATRA'VA, an order of knighthood in Spain, instituted at Calatrava (q. v.). The statutes of the order, framed by the chapter-general of the Cistercian monks, were sanctioned by the Bishop of Toledo in 1164, and afterwards by the pope. At subsequent periods, many privileges were added. After the death of the king, their

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patron, some of the knights were no longer willing to obey the abbot, and they consequently separated themselves from the monks, and elected a grand-master, Don Garcias de Redon. At a later period, they again united themselves to the Cistercians, after they had gained rich possessions from the Moors both in Spain and Portugal. When Castile had fallen into anarchy, and the other kingdoms were exhausting themselves by internal feuds, the war against the unbelievers was almost entirely carried on by the knights of Calatrava. Their almost uniform success, however, gave rise to rashness; the knights were defeated by Emir Jacob ben Yuseff, nearly all of them perished, and Calatrava was occupied by the Moors. After this disaster, the knights transferred their seat to the Castle of Salvatierra, by the name of which they passed for a long time afterwards. A truce of 12 years having been concluded, during which the order revived, the knights were able, at the battle of Las Navas de Tolosa, in 1212, again to turn the tide in favor of the Christians. They then returned to Calatrava. Notwithstanding their splendid achievements, the knights of C. never possessed the vast wealth of their brethren of St James of Compostella (q. v.), a fact which is probably to be accounted for by their having ceded a part of their conquests to the orders of Alcantara and Aviz. But their grand-masters, who were chosen from the highest families in Spain, were very powerful, and exercised a vast influence on public affairs. They did not, however, escape the jealousy of the crown. Two of them were accused of treason, and died on the scaffold; and on the death of the 18th grand-master, in 1489, the administration of the order was transferred to the king by a bull of Pope Innocent VIII. By way of compensation for the loss of their independence, the knights were permitted to marry once, though they were still bound to make vows of poverty, obedience and conjugal chastity; and latterly to profess belief in the immaculate conception. Their original costume consisted of a coat of white mail, with a white scapulary, a black cap, and a pilgrim's hood; but this dress the Anti-pope Benedict VIII., in 1397, granted them permission to exchange for a civil apparel. Their present costume is a white mantle, with a red cross cut out in the form of lilies upon the left breast; while the cross of the order has the same symbol on a silver ground. Two convents for nuns were attached to the order, and were at one time richly endowed. The nuns, attached to the Order of C. in 1579, wore the dress of Cistercian nuns, with the cross of the order on the left side of the capoch, fastened to the scapulary.

CALATRAVA LA VIEJA, a ruined city of Spain, situated on the Guadiana, about 12 miles north-east of Ciudad Real. In the middle ages it was a strongly fortified place, but nothing now remains but a single tower. Its defence against the Moors, undertaken by Raymond, abbot of Fitero, and Diego Velasquez in 1158, after it had been abandoned by the Templars, is famous on account of its having originated the Order of the Knights of Calatrava, long one of the most honorable in Spain. The town was called C. la Viega, or Old Calatrava, in order to distinguish it from the convent of the knights of the Order of Calatrava, erected in the neighborhood in 1214, and which was called Calatrava la Nueva.

CALBURGA, a town of the Nizam's dominions in Hindustan, about 110 miles to the west of Hyderabad. It stands on a tributary of the Beemah, which is itself a tributary of the Kistna or Krishna. It has been successively the capital of Hindu and Mohammedan sovereignties.

CALCAIRE GROSSIER (Fr. "coarse limestone"), the French representative of the Bracklesham Eocene beds. It consists of compact limestones, with seams of chert, and intercalated marls and freestones. The fossils are fresh water and marine mollusca; so abundant are they that in one spot near Grignon no less than 400 distinct species have been procured. Associated with the fresh-water remains are the bones of reptiles and mammalia.

CALCAIRE SILICEUX (Fr. "siliceous limestone") is the French representative of the Bembridge Eocene strata. These compact siliceous limestones extend over a wide area in the Paris basin. The few fossils they contain are fresh water and land shells.

CALCA'REOUS, in Chemistry, is a term applied to substances containing much lime (Lat. *calx*). Thus, *C. waters* are those which hold in solution much carbonate and sulphate of lime, and which are generally known as hard waters, and form a

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deposit in kettles and other vessels when heated therein.—*C. rocks* are those in which lime forms the prevailing element. They may be chemically formed, as in the case of tufas, where a saturated solution of carbonate of lime in water is deposited from evaporation or other causes; but they are generally aqueous rocks, the materials of which are supplied by animal remains. Thus, many rocks, like the mountain-limestone, are composed of shells, corals, and encrinites; while others, like chalk, consist of foraminifera and fragments of other minute testacea. A crystalline structure, varying in degree from the partially crystallised carboniferous limestones to the saccharine statuary marble, is produced in calcareous rocks by metamorphic action. Oolite is a variety of limestone composed of small egg-like grains resembling the roe of fish. The existence of lime in rocks can always be detected by the application of dilute nitric or muriatic acid, when it effervesces from the liberation of the carbonic acid. Pure lime is obtained from calcareous rocks by calcining them—i. e., by driving off the carbonic acid and other volatile matter by heat.—*C. soils* are produced from the disintegration of calcareous rocks. When the rocks are perfectly pure, they generally yield barren soils, as in many chalk and limestone districts of Britain; but when the lime is mixed with clay, so as to form marl, and has a little vegetable matter added, it forms an excellent though rather light soil. Calcareous soils are difficult of drainage, owing to the property that soft lime has of retaining water, although it easily yields it up by evaporation. Such soils are consequently soon dry at the surface after rain, but yet rarely suffer severely from drought.

CALCAREOUS SPAR, or Calc-Spar, the name usually given by mineralogists to carbonate of lime, rhombohedral in its crystallisation. It differs from arragonite only in crystallisation. See ARRAGONITE. C. S. occurs in all geological formations, and is one of the most abundant of all minerals. It often completely fills cavities in rocks; and although it has been prevented by want of space from assuming a crystalline form, is readily divided by the knife and hammer into rhomboids, the primary form of its crystals being a rhomboid, of which the greatest angles are 105° 5′. Its secondary forms are more numerous than those of any other mineral. More than seven hundred have been observed. One of the most common, a rather elongated pyramid, is sometimes called *Dog-tooth Spar*. C. S. is colorless and transparent, except in consequence of impurities which may be present in it; and when perfectly transparent, it exhibits in a high degree the property of double refraction of light, which was first discovered in it by Bartholinus. The presence of foreign substances frequently renders C. S. gray, blue, green, yellow, red, brown, or even black.

The name *Iceland Spar* has often been given to C. S., at least to the finest colorless and transparent variety, because it is found in Iceland, massive in trap-rock. *Slate Spar* is a lamellar variety, often with a shining, pearly lustre, and a greasy feel, of which Wicklow in Ireland, and Glen Tilt in Scotland are localities.

CALCAREOUS TUFA, Calc-Tuff, or Tufaceous Limestone, a mineral which in its chemical composition is nearly identical with limestone and marble; but is distinguished by its spongy and cellular structure. It is generally rather soft, brittle, and friable, but sometimes it is sufficiently hard to be used as a building stone. The *travertino*, used for building at Rome, is a hard calcareous tufa. The color of C. T. is generally yellowish-gray, sometimes yellow or yellowish-brown. It occurs massive, or assumes many uncrystalline forms, as tubular, botryoidal (like clusters of grapes), cellular, &c. Sometimes it incrusts animal and vegetable remains. It is frequent in the neighborhood of calcareous springs. It is sometimes used as a filtering-stone.

CALCE'DONY. See CHALCEDONY.

CALCEOLA'RIA (Lat. *calceolus*, a little shoe), a genus of plants of the natural order *Scrophulariaceæ* (q. v.), of which there are numerous species, natives of South America, chiefly of that part of the Andes which is more than 9600 feet above the sea, a few of them reaching almost to the utmost limits of vegetation; although some are found in lower and warmer situations, and some in the southern extremity of the American continent. They abound so much in some parts of Chili and Peru, as to give a peculiar aspect to the landscape. The calyx in this genus is 4-partite; the corolla,

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2-lipped; the lower lip remarkably inflated, so as to form a bag; and the shape of the whole in some species considerably resembling that of a slipper. There are only two fertile stamens, and the capsule is semi-bivalvular with bifid valves. Some of the species are shrubby, some herbaceous, almost all the herbaceous species being perennial. Many of them have corymbs of numerous showy flowers. Yellow is the color which chiefly prevails in the flowers of the original species, and next to it purple; but the art of the gardener has succeeded in producing varieties and hybrids which exhibit many other rich and delicate tints. Calceolarias have been florists' flowers since about 1830, the curious appearance of the flowers combining with their beauty to render them attractive, and in no genus is the production of hybrids more easily or frequently effected. They are easily propagated by cuttings. Few plants require more liberal supplies of water. They are generally treated in Britain as half-hardy or as greenhouse plants.—Some of the species are used in South America for dyeing. The roots of *C. arachnoidea*, a parent of many of the hybrids in our gardens, are largely employed in Chili, under the name of *Relbum*, for dyeing woollen cloths crimson.

CALCINA'TION; or Calci'ning (see CALX), is the process of heating or roasting in furnaces or in heaps the various metallic ores. It is resorted to as the first stage in the extraction of the majority of the common metals from their ores, and is essentially a process of oxidation.

CA'LCIUM is the metal present in chalk, stucco, and other compounds of lime. It may be obtained by passing a powerful current of voltaic electricity through fused chloride of C. (CaCl), when the metal separates in minute globules. It is a yellowish-white metal, can be rolled into sheets, and hammered into leaves, and is intermediate between lead and gold in hardness. It is represented by the symbol Ca, has the atomic weight, or equivalent 20 (new system, 40), and has the density 1·578, or nearly half as heavy again as water. At ordinary temperatures, it slowly tarnishes by oxidation; and when placed in contact with water, it rapidly decomposes the water (HO), forming lime (CaO), whilst hydrogen escapes. To be retained bright, C. must be kept under the surface of naphtha. At a red heat, it melts and burns with a dazzling white light, accompanied by scintillations. See LIME.

CALCOTT, Sir Augustus Wall, R.A., a distinguished English landscape painter, was born at Kensington, London, in 1779. In 1803, he devoted himself to landscape painting; in 1810, was made a member of the Royal Academy; was knighted in 1837; and in 1844, made conservator of royal pictures. His landscapes are remarkable for their beauty, clear definition of objects, good drawing, and truthful natural coloring. He has been called the English Claude, a designation to which he is not altogether uncntitled. He died November 1844.

CALCOTT, John Wall, a distinguished musical composer, elder brother of the above, was born at Kensington, 1766. Too nervous to be a surgeon, for which he was intended, he devoted his attention to music, and in 1785 won three of the four gold medals annually given by the Catch Club, the admired "O Sovereign of the willing Soul" being one of the successful pieces. During the next ten years, he obtained twenty of the medals given by the same society. In 1785, he was made Bachelor, and five years afterwards, Doctor of music at Oxford. In 1805, he published his "Musical Grammar;" in the following year his mind gave way under the continuous strain to which it had been subject. He recovered again, but only for three years, when he relapsed, and continued insane until his death in May 1821. He was one of the most eminent composers belonging to the British school of music, and especially celebrated for his glee compositions. His choicest productions were published in two volumes by his son-in-law, Mr. Horsley, in 1824.

CA'LC-SINTER, a mineral, chemically identical with the purest marble and calcareous spar, but peculiarly characterised by its fibrous structure. It is formed from water holding carbonate of lime in solution, and occurs generally incrusting the roofs, walls, and floors of caves, particularly those in limestone rocks; often assuming curious and even fantastic forms. Macalister's Cave, in the Isle of Skye, and the limestone caves of Derbyshire, are the most celebrated British localities. But the stalactitic cave of Antiparos, in the Grecian Archipelago, is a far more famous locality for this mineral, which is often called *Calcareous Alabaster*, and

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used for the same purposes with the true alabaster (q. v.), to which it is in some respects preferable, particularly as not being liable to injury from exposure to the air. Volterra, in Tuscany, is another very famous locality for Calc-sinter.

CA'LCULATING MACHI'NE. The most remarkable application hitherto made of machinery, is perhaps that through which it has been used to relieve the scientific inquirer to a very great extent of the fatigue of manipulating figures, which consumes so much of his time and energies. Various machines have been constructed for this purpose, differing in the extent of their faculties—to use words more suitable to thinking beings than to engines—and somewhat in the principles of their construction. By the *Arithmometer*, for instance, a machine invented by M. Thomas of Colmar, all ordinary arithmetical operations are executed without fatigue to the operator; and by a machine contrived by M. M. Scheutz, which rests on the principle of *Differences* (q. v.), on the turning of a wheel, the successive terms of any series whose law may be confided to it, are produced—the machine at the same time *printing* a large proportion of its results, and thus providing for the accuracy of its tables. It is a fact of which the nation should be proud, that our countryman, Mr Babbage, is universally acknowledged as the instigating and guiding genius in the progress of these remarkable inventions. Among his inventions was a *Difference Engine*, of very comprehensive powers, indeed capable of managing series so complex that the differences of its terms do not reach zero until we ascend to the seventh order (*vide* art. DIFFERENCES, CALCULUS OF). An immense range of nautical and astronomical tables lie within the limits just defined; and the machine further tabulates approximately any series whatever that can be treated by the *Method of Differences*. While engaged in constructing the *Difference Machine*, Mr Babbage, probably through his increased experience of the capabilities of machinery, was led to form a new conception—that, namely, of the *Analytical Machine*. He actually succeeded so far as to devise the means of making his machine perform all the elementary operations of addition, subtraction, multiplication, and division; and it is clear that all changes that can be produced on quantity are merely combinations of these. If, then, he could but have made his machine perform these operations at command, and according to any special order, it could have clearly developed any function whatever whose law is ascertained and fixed. A solution of this difficulty was suggested by the Jacquard Loom (q. v.), in which the *cards* oblige a machine capable of working *any* pattern to work out one particular pattern; and Mr Babbage having succeeded so far as to form a machine capable of executing any development, expected, by means of *cards of operations*, to compel his C. M. to work according to one fixed law, and no other. Government, however, did not see its way to make the further grants required for this machine, and at Mr Babbage's death in 1871, nothing further had been done towards its completion. The *Difference Machine* is now lying, an unfinished curiosity, in the museum of King's College, London. Both machines will be found described in the third volume of Taylor's "Scientific Memoirs." The *Difference Engine*, constructed by Grant for the university of Pennsylvania, is said to be less expensive than Babbage's, and less complicated than Scheutz's, though provided like it with an apparatus for printing the results.

CA'LCULUS, or Stone (in Medicine), a hard concretion formed within the animal body, in consequence of the deposition in the solid form of matters which usually remain in solution. See CONCRETION. The concretions most commonly termed calculi are those formed in the kidneys or bladder (*Urinary C.*); and those formed in the gall-bladder or biliary ducts (*Biliary C.*). Both of these give rise to very painful symptoms, and may even threaten life.

Biliary C. or *Gall-stone*, may generally be presumed to exist when excessively severe pain suddenly arises in the right side beneath the border of the ribs, and when in a few hours jaundice comes on, shewing that some obstruction has existed to the outward flow of the bile. But the absolute proof that these symptoms depend on C. is often wanting. The pain is fortunately transitory, but is more severe while it lasts than almost any other known form of suffering, unless it be that of a C. in the kidney and ureter. It may be relieved by large doses of opium, but the remedy requires to be cautiously given, as even in medical hands fatal accidents have occurred. Gall-stones, when impacted in the ducts, sometimes have proved fatal; but

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much more frequently they find their way, sooner or later, into the intestines. They are almost invariably composed of cholesterine (q. v.), with coloring matter and mucus, arranged in layers in a semi-crystalline disposition.

Urinary C. is a disease of all ages, but most common in advanced life and in the male sex. It is also very frequent in gouty persons, or among those who pursue sedentary occupations, and live freely. It is rare among those who live much in the open air, or who take much violent exercise, and use little animal food and wine. Among sailors it is peculiarly rare. In certain parts of the country, the disease is said to be frequent, as in Norfolk, and perhaps along the east coast of Scotland. In India, too, where some of the predisposing circumstances mentioned above can hardly be said to prevail, stone is by no means uncommon. It would appear, therefore, that the predisposing causes of C. are still very imperfectly understood. In its early stages, the disease usually presents itself in the form of *Gravel*, shewn by the passage of numerous very small portions of gritty concretions, which may be observed in the urine as a deposit like sand, or like small grains of Cayenne pepper. When such deposits occur frequently, especially if they are present at the time of passing the urine, and not merely after it has cooled, there is reason to apprehend the formation of calculus. If, in these circumstances, there are pains of a dull character in the loins, with occasional twinges of sharper suffering, no time should be lost in seeking medical advice. If a fit of very severe pain should occur in a person for some time affected with gravel, if the urine be bloody, if agonising twinges, commencing in the loins, sting downwards into the thigh or the groin, it is probable that a stone has already formed in the kidney, and is being displaced towards the bladder. C. in the bladder is at first attended with little suffering, as compared with that caused by the stone in its passage downwards from the kidney; but unless removed or evacuated, the C. is sure to enlarge, and then it becomes the cause of one of the most painful diseases that afflict humanity. The existence of a stone in the bladder, however, should never be taken for granted without a surgical examination, all as the symptoms are deceptive in certain cases. The most striking, and perhaps the most trustworthy evidence of stone in the bladder, apart from the use of the sound (see LITHOTOMY), is smarting and burning pain experienced after the bladder has been emptied, together with occasional temporary stoppage in the flow of urine. The correct appreciation of all the symptoms, however, demands considerable familiarity with such cases.

The discovery of the tendency to urinary C. at an early period of its growth, has been greatly aided by the use of the microscope and of chemical tests. Generally speaking, it may be said that whenever the urine, after standing for a few hours, can be observed to contain more sediment than a very slight cloudiness towards the bottom of the vessel, there is room for careful inquiry into the existence of some derangement of the health. But all sediments are not equally apt to determine C., nor is the treatment of the different kinds of sediment at all similar; care should therefore be taken to determine, from time to time, whether the character of the sediment may have undergone a change, so that the treatment may be adapted accordingly.

The chief varieties of urinary C. are—1. Uric acid (red sand); 2. Urates of ammonia, soda, lime, &c. (brick-dust sediment); 3. Phosphates of ammonia and magnesia, lime, &c.; 4. Oxalate of lime; 5. Carbonate of lime (chiefly in domestic animals); 6. Cystine; 7. Xanthic oxide (a very rare form, discovered by Dr Marcet). Calculi are frequently found to be composed of numerous successive layers, having a perfectly distinct chemical composition. Urates and phosphates in particular frequently succeed each other, and form what is called an alternating calculus.

When C. has once fairly formed in the urinary passages, it seems probable that no absolute cure exists except the removal of it, if possible, from the body (see LITHOTOMY and LITHOTRITY); but in the stage of gravel, and still more in the earlier stages detected by careful examination of the urine, much may be done to check the tendency to this distressing and dangerous malady. The chief remedies consist in careful regulation of the diet and mode of living, together with the use of solvents adapted to the particular form of deposit found to be habitually present. See URINE.

CA'LCULUS, the Infinitesimal, otherwise sometimes called the Transcendental Analysis, is a branch of mathematical science which commands, by one general

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method, the most difficult problems in geometry and physics. The merit of the invention of this powerful mathematical instrument has been claimed for Leibnitz, but is undoubtedly due with equal justice to Newton, who laid the foundations for it in that celebrated section of his "Principia" in which he demonstrates the chief theorems regarding the ultimate values or limits of the ratios of variable quantities. The view of one class of writers is, that these distinguished men invented the C. simultaneously and independently; and it is the fact that Leibnitz's system is unfolded from premises differing somewhat from those of Newton. See FLUXIONS. Another class of writers hold that Newton is the real inventor, and that to Leibnitz no more can be conceded than that he was the first who, using the suggestions of Newton's genius, gave a systematic statement to the principle of the transcendental analysis, and invented its appropriate symbolic language. He had the doctrine of limits before him when he wrote, and did little more than unfold more fully the logic of the processes therein suggested, and exhibit them in algebraical forms.

The Infinitesimal C., both in its pure and applied forms, whether of geometry or mechanics, is a branch of the science of number; its symbols are of the same kind, are operated on according to the same laws, and lead to analogous results. It differs from the other branches of the science of number, such as arithmetic and algebra, in regarding number as continuous—i. e., as being capable of gradual growth and of infinitesimal increase, whereas they deal with finite and discontinuous numbers. It differs from ordinary algebra in another respect. In the latter, the values of unknown quantities, and their relations with each other, are detected by aid of equations established between these quantities *directly*; in the C., on the other hand, the equations between the quantities are not directly established, but are obtained by means of other equations primarily established, not between them, but certain derivatives from them, or elements of them. This artifice is most fertile, for it can be shewn that in the great majority of cases the relations of quantities concerned in any problem may more easily be inferred from equations between these their derivatives or elements than between themselves.

It will be seen that the C. created a new notion of number—as continuous or growing. It is now necessary, in order to a proper conception of it, that a precise idea should be formed of a *differential*. The simplest idea of a differential is unquestionably that got by considering number as made up of infinitesimal elements, and a differential or "infinitesimal" as being the value of the difference between a number at one stage of its growth and at another *very* near it. Every finite number being—in the view of the C. as first conceived by Leibnitz—composed of an infinite number of these infinitesimal elements, certain axioms at once present themselves regarding infinitesimals; as, for instance, "that a finite number of them has no value at all when added to a finite quantity." Many other such axioms readily follow, from which, on this view, the whole theory of the infinitesimal C. may be constructed. But there are logical objections to this mode of forming the theory of the transcendental analysis, and of three views that have been propounded, that now universally accepted as the most logical, and as being capable of the easiest application, is that founded on the method of limits, already referred to as the invention of Newton. The meaning of a differential on this view will now be explained.

It is clear that the C. can be applied only where numbers may have the continuous character—i. e., where they are or may be conceived as being variable. If two unknown quantities are connected by a single equation only, we clearly have the condition satisfied, as where y and x are connected by the equation.

$$(1)\quad y = F(x),$$

where F is a sign denoting some *function* of x, as tan. x, cos. x, x^2, &c. This equality may be satisfied by innumerable values of y and x. One question which the C. solves is, how does y vary when x varies? To solve it, and, at the same time, shew how the doctrine of limits affects the definition of a differential, suppose x, y, and $x + Dx$. $y + Dy$, to be two pairs of values of the variables which satisfy the above equation; then

(2) $y = F(x)$, and (3) $y + Dy = Fx(+ Dx)$. From (2) and (3) we have, by subtraction.

$$(4)\quad Dy = F(x + Dx) - F(x);$$

whence we have the ratio

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$$\frac{Dy}{Dx} = \frac{F(x + Dx) - F(x)}{Dx}$$

This ratio will generally change in value as Dx and Dy diminish, till, as they both vanish, which they must do simultaneously, it assumes the form $\frac{0}{0}$. Taking this form, it ceases to have a determinate actual value, and it is necessary to resort to the method of limits to ascertain the value to which it was approaching, as Dx and Dy approached zero. Let, then, dx and dy be any quantities whose ratio is equal to the limiting ratio of the increments Dx, Dy, so that

$$\frac{dy}{dx} = \text{limit} \frac{Dx}{Dy}$$

as Dx and Dy approach zero. Then dx and dy are the differentials of x and y. It may be observed that where x and y are connected as above, they cannot vary independently of one another. In the case assumed, x has been taken as what is called the *independent* variable, the question being, how does y vary when x varies. If y were made the independent variable, it would be necessary to solve the equation $y = F(x)$, if possible, so as to express x in terms of y. The result would be an equation $x = \varphi(y)$. This being obtained, we should find $\frac{dx}{dy} = \text{limit} \frac{Dx}{Dy}$ as before. It will be seen that on this view differentials are defined merely by their ratio to one another. Their actual magnitude is perfectly arbitrary. This, however, does not render an equation involving differentials indeterminate, since their relative magnitude is definite, and since, from the nature of the definition, a differential cannot appear on one side of an equation without another connected with it appearing on the other.

The idea of a differential being once comprehended, the reader will be able to understand, in a general way, the main divisions of the C., which we shall now briefly delineate. So much is clear from what has been stated, that there must be two main divisions—one by which, the primary quantities being known, we may determine their differentials; and another by which, knowing the differentials, we may detect the primary quantities. These divisions constitute the Differential C. and Integral C. respectively.

1. The Differential Calculus.—Recurring to the formula already given we know

$$\frac{dy}{dx} = \text{limit} \frac{Dy}{Dx} = \text{limit} \frac{F(x + Dx) - F(x)}{Dx}$$

It is clear that, in the general case, $\frac{F(x + Dx) - F(x)}{Dx}$ at the limit will still be some function of x. Calling $F'(x)$, we have generally $\frac{dy}{dx} = F'(x)$. $F'(x)$ is called the first differential coefficient of y or $F(x)$. Being a function of x, it may be again differentiated. The result is written

$$\frac{d^2y}{dx^2} = F''(x),$$

$F''(x)$ being the second differential coefficient of y or $F(x)$; and again $F''(x)$ may be a function of x, and so capable of differentiation. Now, it is the object of the differential C. to shew how to obtain the various differentials of those few simple functions of quantity which are recognised in analysis, whether they are presented singly or in any form of combination. Such functions are the sum, difference, product, and quotient of variables, and their powers and roots; exponentials, logarithms; and direct and inverse circular functions. The C. so far is complete as we can differentiate any of those functions or any combination of them—whether the

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functions be explicit or implicit; and with equal ease we may differentiate them a second or any number of times. This C. is capable of many interesting applications as to problems of maxima and minima, the tracing of curves, &c., which cannot here be particularly noticed.

2. THE INTEGRAL CALCULUS deals with the inverse of the former problem. The former was: Given $F(x)$, to find $F'(x)$, $F''(x)$, and so on. The present is in the simplest case—viz., that of an explicit function: Given $\frac{dy}{dx} = F'(x)$, to find $F(x)$. The methods of the Integral C., instead of being general, are little better than articles suited to particular cases; no popular view can be given of these. In many cases, integration is quite impossible. The explanation or *integration by parts*, by *approximation*, *definite integrals*, and *singular solutions*, is far beyond the scope of the present work. The reader is referred to any of the numerous text-books on the subject. The Integral C. has applications in almost every branch of mathematical and physical science. It is specially of use in determining the lengths of curved lines, the areas of curved surfaces, and the solid contents of regular solids of whatever form. The whole of the lunar and planetary theories may be described as an application of the integral C., especially of that branch of it which deals with the integration of differential equations. It is applied, too, in hydrostatics and hydrodynamics, and in the sciences of light, sound, and heat. In short, it is an instrument without which most of the leading triumphs in physical science could never have been achieved.

CALCULUS OF VARIATIONS.—The foundation of this C. is a method of differentiation, but quite of a peculiar kind. As above explained, the object of the differential C. is to determine the form which a function, such as $F(x)$, will assume if x receive an indefinitely small increment, such as Dx. In the C. of variations, the object is to ascertain and lay down the laws of the changes supervening on a slight alteration of the *form of the function*, or should $F(x)$ become F_1x. This C. commands with ease a class of problems called problems of isoperimeters, which were formerly insoluble. It has also power over mechanical problems, and many departments of high physics cannot be touched without its aid. Mr Airy and Professor Jellet have both written works on the subject, which may be consulted.

CALCULUS OF FINITE DIFFERENCES, CALCULUS OF FUNCTIONS.—For brief notices of these growths from the original Transcendental Analysis, see the articles under the headings DIFFERENCE and FUNCTIONS.

CALCU'TTA (*Kali Ghatta*, the ghaut or landing-place of the goddess, Kali), the capital of the province of Bengal, and metropolis of British India, is situated on the left bank of the river Hooghly, an arm of the Ganges, in 22° 35′ n. lat., and 88° 27′ e. long., about 100 miles from the sea by the river. C. was founded by Governor Charnock in the year 1686, by the removal hither of the factories of the East India Company. In 1700, three villages surrounding the factories having been conferred upon the company by the emperor of Delhi, in recognition of a present made to Azim, a son of Aurungzebe, they were forthwith fortified, and received the name of Fort William, in honor of the reigning king; but the place was subsequently termed Calcutta, the name of one of the villages. In 1707, C. had acquired some importance as a town, and was made the seat of a presidency. In 1756, however, a great misfortune befell the rising town; it was unexpectedly attacked by Surajah Dowlah, the Nawaub of Bengal, and being abandoned by a number of those whose duty it was to defend the place, it was compelled to yield after undergoing a two days' siege. Only 146 men, however, fell into the enemy's hands; but these were treated with heartless cruelty. Cast at night into a confined cell, about 20 feet square—the notorious "Black Hole" (q. v.)—they endured the most unheard-of-sufferings, and in the morning it was found that only 23 out of 146 had survived the horrors of that night. The city remained in the hands of the enemy until eight months afterwards, when Clive arrived in the country from England. In conjunction with Admiral Watson, Clive succeeded in recapturing the town, and afterwards concluded a peace with the Nawaub. Soon after this, and subsequent to the important victory of Plassey, the possessions of the East India Company were greatly extended by means of grants made by the emperor of Delhi, and C. once more resumed its career of progress, and

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advanced rapidly in prosperity. In 1853, C. was erected into a municipality, the proprietors paying assessments, and electing commissioners to apply the proceeds of these assessments in cleansing, improving, and embellishing the town. In 1837, the population of the town proper amounted to 229,700; in 1872, it had increased to 447,691, and if we include the suburban parts, the number will stand 892,429. Besides these, thousands of the three and a half millions who sleep at night in the surrounding districts of Hooghly and the twenty-four Pergunnahs, flock during the day to C., on foot, by boat, or by railway, to their daily toil. The inhabitants are mostly Hindus; but there is also a good proportion of Mohammedans. About 20,000 are Europeans; 20,000 Eurasians, or the progeny of white fathers with native mothers; and there is a considerable number of Armenians, Greeks, Jews, Parsees, and negroes. The city extends for about five miles along the river, and is somewhat less than two miles in breadth at its broadest part, the area being about eight square miles, and comprised for the most part between the river and the Circular Road, a spacious roadway which marks the landward boundary of the city proper. Beyond this road there lie extensive suburbs, the chief of which are Chitpore on the north, Nunden Baugh, Bahar-Simleah, Sealdah, Entally, and Ballygunge on the east, and Bhowaneepore, Allipore, and Kidderpore on the south. The villages of Sulkeah, Howra, and Seebpoor are situated on the opposite side of the river, and contain the salt-golahs or warehouses of the government, extensive manufactories, dockyards, and ship-building establishments. The appearance of the city as it is approached by the river is very striking; on the left are the Botanical Gardens, destroyed by the cyclones of 1867 and 1870, but since replanted, and the Bishop's College, a handsome Gothic edifice, erected by the Society for the Propagation of the Gospel in Foreign Parts; on the right is the suburb of Garden Reach, with its handsome country seats and beautiful gardens; further on are the government dockyards and the arsenal; beyond these is the Maidan Esplanade, which has been termed the Hyde Park of India, being the favorite place of resort of the *élite* of C. for their evening drive. Here, near the river, lies Fort William, the largest fortress in India, having been constructed at a cost of £2,000,000, and occupying, with the outworks, an area of about a half a mile in diameter. It is garrisoned by European and native soldiers, mounts 619 guns, and its armory contains 80,000 stands of small-arms. Facing the Esplanade, among other fine buildings, is the Government House, a magnificent palace erected by the Marquis of Wellesley. Beyond this, extending northwards along the river bank, is the Strand, two miles in length, and 40 feet above low water, with various ghauts or landing-places. It is adorned by many fine buildings, including the Custom-house, the new Mint, and other government offices, and the appearance given by these and other edifices has gained for C. the appellation of "City of Palaces." Among its other places of interest mention may be made of the Sudder Dewanee Adawlut, the principal court of justice; the town-hall, a fine building; the Bengal Club, Writers' Buildings, Bank of Bengal, Jesuits' College, Medical College, university, theatre, besides various churches, mosques, Hindu temples, and pagodas and numerous bazaars. There are a number of monuments throughout the city, the most noticeable being those erected to the Marquis of Wellesley and Sir David Ochterlony. Although the European quarter of the town is distinguished for its fine public buildings and commodious dwelling-houses, the quarters occupied by the natives present a very different appearance, their houses being in most instances built of mud or bamboo and mats, and the streets narrow and unpaved. Considerable improvements have, however, been effected of late; new and wider streets have been opened through crowded quarters; brick houses are fast replacing the huts, and an extensive system of drainage has been carried out, to the no small advantage of the inhabitants. The cyclone of November 1867 destroyed 30,000 native houses, and that of June 1870 was likewise very destructive.

The water supply of C. has recently been very much improved. Formerly, the water was kept in large tanks, interspersed throughout the city, whence it was borne by water-carriers or *bahisties* in large leather bags. But within the past five years, a supply of excellent water has been obtained from the Hooghly, about 15 miles above C., where it is filtered and sent down by pipes in the usual way. The result of this has been a marked improvement in the health of the city. Gas has now taken the place of the oil-lamps which were formerly in general use for lighting

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the streets at night. Tramways have been recently tried in some of the principal streets, but as yet with little success. A canal girds a part of the city beyond the Circular Road.

The communications of C. afford great facilities for its extensive commerce. There are several lines of railway to various parts of India; the East Indian to Benares, Delhi, and Multan, its present terminus, whence it is to be continued to Kurachee; the Eastern Bengal, the extension of which to Gulundu was opened in 1871; and the Calcutta and South-eastern to the mouth of the Ganges. The great Indian Peninsular Railway branches off from the East Indian, and connects C. with Bombay and Madras. C. is also connected by electric telegraph with the principal towns in India and can communicate with England by three different lines. Uninterrupted communication is kept up with Great Britain by numerous and well-appointed steamers and sailing vessels. This intercourse has been greatly facilitated by the opening of the Suez Canal. Navigation on the Hooghly is dangerous, owing to the shifting sands; and though much has been attempted, little has been effected in the way of remedying the evil. The river, adjacent to the city, varies in breadth from a quarter of a mile to nearly a mile. Ships of 2000 tons can ascend to C.

The growth of scientific and literary societies, here and elsewhere in India among the native communities, indicates a degree of progress and intellectual activity very hopeful for the future of India. The principal of these in C. are the Bengal Asiatic Society, founded in 1784 by Sir W. Jones, possessing a fine library, and a valuable and extensive museum; the Bethune Society, for the promotion of intercourse between European and native gentlemen; the Dalhousie Institute, for the literary and social improvement of all classes of the community; the Bengal Social Science Association, and others. The university of C. was founded in 1857, on the same basis as the London University, and exercises functions over Bengal, the North-west Provinces, Oudh, and the Central Provinces. Colleges have been instituted to prepare undergraduates for the university. In 1871, of 1503 Bengal candidates for admission, 581 passed the required examinations. Other educational institutions are numerous in C. The principal places for religious instruction are Bishop's College, intended chiefly for the education of missionaries and teachers, and the institutions of the Established and Free Churches of Scotland, for the same purpose, all which are ably conducted.

C. may be regarded as the great commercial centre of Asia. One-third of the whole trade of India is done here. In 1872, the exports amounted to $27,477,127, exclusive of treasure, and the imports to $15,667,285. The chief exports are jute, cotton, rice, sugar, indigo, coffee, tea, saltpetre, linseed, shellac, buffalo horns, hides, castor-oil, catch, gunny bags, &c. The jute exported in 1872 was valued at £4,000,000, the indigo at £2,500,000, and the tea at £1,400,000. In the same year 658 sailing-vessels and 301 steamers, with a total tonnage of 999,614, arrived in the Hooghly; and 637 sailing-vessels and 301 steamers, with a total tonnage of 957,528, sailed. The principal industries are sugar refining, cotton manufacturing, flour, saw, and oil mills, and ship-building docks. Several newspapers are published. There are a few banks and numerous insurance and other companies, with a Chamber of Commerce. Living is comparatively cheap, and most of the luxuries of life, as well as its necessaries, are to be had in the unpretentious shops of C. as readily as in most European towns. The annual fall of rain averages 64 inches; the temperature in the shade ranges in July from 78° to 87°, and in December from 60° to 79°.

C. is the headquarters of the governor-general of India, and the seat of the government, the supreme courts of justice, and of the court of appeal for the province of Bengal.

CA'LDAS, or Calde'las (Lat. *callidus*, hot), the Spanish for warm springs (*aquas*, waters being understood), which are very abundant in the Peninsula, where a great number of places have received their names from the presence of these mineral waters; such as C. de Malavella, C. de Estrac, and C. de Mombuy, in Catalonia; C. de Reyes, C. de Cuntis, and C. de Tuy, in Galicia; C. de Talpas, C. de Faveios, C. do Rainhas, and C. de Renduse, in Portugal. The name has also passed into the topography of the New World. There is a C. in Brazil, which is noted for its hot sulphur springs.

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CA'LDER, a river in the West Riding of Yorkshire. It rises in a marsh on the borders of Lancashire, near Burnley, runs tortuously east in the deep valley of Todmorden, past Halifax, Dewsbury, and Wakefield. It then runs north-east, and after a total course of 40 miles, it joins the Aire near Pontefract, that river falling into the Ouse. The C. is important as forming a considerable portion of the canal route through Yorkshire and Lancashire, between the east and west coasts of England.

CA'LDERON (Don Pedro) de la Barca Henao y Riano, was born in Madrid, in the year 1601, and received his early education in the Jesuits' College at Madrid. Afterwards, at Salamanca, he studied chiefly history, philosophy, and law. His poetical genius was precocious. Before he was 14 years old, he had written a drama "El Carro del Cielo" (The Celestial Chariot). In early life he gained by his poetry, and also by his fertile invention of decorations, &c., for festive occasions, the patronage of several distinguished persons, and, on leaving Salamanca, 1619, was well received by the courtiers at Madrid. Love of military adventure induced him to enter the army, 1625; and, after serving with distinction in Milan and the Netherlands, he was recalled to the court of Philip IV., a prince fond of theatrical amusements, by whom he was employed to superintend various court-amusements, and especially to invent dramas for the Royal Theatre. In the following year C. was made knight of the order of San Jago, and took part in the campaign at Catalonia. Peace brought him back to poetry. The king gave him a pension, contrived to let him cultivate uninterruptedly his fertile dramatic genius, and spared no cost in securing for his plays a splendid initiation on the stage. In 1651, C. received from the head of the order of San Jago permission to enter the church, and, in 1653, was appointed to the chaplaincy of the arch-episcopal church of Toledo; but as this post removed him too far from the court, he was appointed chaplain in the Royal Chapel at Madrid, 1663, and received, with other favors, a pension charged on the revenue of Sicily. In the same year he was appointed a priest in the brotherhood of San Pedro, and, shortly before his death, was elected by his brethren as their *capian mayor*. He died May 25, 1681, leaving his considerable property to the fraternity of San Pedro, by whom a splendid monument to his memory was raised in the church of San Salvador at Madrid. Fame and pecuniary prosperity had accompanied his career. The chief cities of Spain—such as Toledo, Seville, and Granada—had paid him, from time to time, large sums of money for writing their "Autos Sacramentales," or "Corpus Christi" pieces. In these compositions, C. excelled all his predecessors, and esteemed them more highly than all his other works, though in many respects the latter display the author's genius quite as remarkably.

Spain numbers C. among its greatest poets, and criticism must allow that many of the defects in his works are to be ascribed to circumstances, and the times in which he lived, rather than to the native tendencies of his genius. He is characterised by brilliancy of fancy, elegance of versification, and a richness of detail, which from its very abundance often becomes tedious. His collected dramatic works—including many pieces of intrigue, heroic comedies, and historical plays, of which some deserve the title of tragedy—amount to 128. Among his romantic tragedies, the "Constant Prince" (El Principe Constante) holds the first rank. Besides these, he wrote 95 "Autos Sacramentales;" 200 "Loas" (preludes); and 100 "Saynetes" (divertissements). His last play, "Hado y Divisa," was written in his 80th year. His shorter poems have perished; but his dramas have held their place on the stage better than those of Lope de Vega himself. The most complete edition of his dramas appeared at Madrid (9 vols., 1683—1689); another was published by Apuntes (10 vols., Madrid, 1760—1763). Goethe and Schlegel have made him popular in Germany, but in Britain he is not well known, and in France not cared for.

CALDERON, Don Serafin Estebanez, a Spanish poet, was born at Malaga about the commencement of the century, studied law at the university of Granada, and in 1822 became professor of poetry and rhetoric there. A volume of poems which he published shortly after procured for him some distinction. Subsequently, he became an advocate in his native city, but still continued faithful to the muses. In 1830, he went to Madrid, where he published anonymously his "Poesias del Solitario" (1833). He also wrote several articles on Andalusian manners for the "Cartas Españolas," the only literary journal at that period in Spain. In 1836 he was

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appointed civil governor of Logroño, but an accident obliged him to return to Madrid, where he devoted himself to collecting MSS. of the old national literature, to be the basis of a great critical edition of the "Cancioneros and Romanceros." C. wrote likewise a fine novel, "Cristianos y Moriscos." To the literature of the Spanish Moors he paid great attention. His "Escenas Andaluces" (1847) are a series of lively sketches of Andalusian life. At his death in Feb. 1867, he left behind him a work on the "Expediciones y Aventuras de los Españoles en Africa." The Spanish government purchased his very valuable library.

CALDERWOOD, David, an eminent Scottish divine and ecclesiastical historian, descended of a good family, was born in 1575, and about 1604 was settled as Presbyterian minister of Crailling, Roxburghshire. Opposed to the designs of James VI. for the establishment of Episcopacy in Scotland, on that monarch's visit to his native country in 1617, he and other ministers signed a protest against a bill, then before the Scots parliament, for granting the power of framing new laws for the church to an ecclesiastical council appointed by the king, and in consequence he was summoned before the High Commission of St Andrews. Refusing to submit, he was committed to prison for contumacy, and then banished the kingdom. He retired to Holland, and in 1623 published there his celebrated controversial work, entitled "Altare Damascenum," &c., in which he rigorously examined the origin and authority of Episcopacy. In 1622, a pretended recantation of his protest was published at London by a venal writer, Patrick Scott. While on the continent, C. was known by the quaint appellation of Edwardus Didoclavius, being an anagram on his name Latinised. After King James's death in 1625, he returned to Scotland, and for some years was engaged in collecting all the memorials relating to the ecclesiastical affairs of Scotland, from the beginning of the Reformation there to the death of James VI. In 1638, he became minister of Pencaitland, near Edinburgh; and in 1643 was appointed one of the committee for drawing up the "Directory for Public Worship in Scotland." He died at Jedburgh in 1651. From the original MS. of his "History of the Kirk of Scotland," preserved in the British Museum, an edition was printed for the Woodrow Society) in 8 vols., 8vo (Edin. 1842—1845), edited by the Rev. Thomas Thomson.

CALDIE'RO (ancient *Caldarium*), a decayed town of North Italy, about nine miles east of Verona. Its thermal springs were in repute as early as the 1st c. of the Christian era, and continued to enjoy popularity until the commencement of the 16th c., after which they gradually became neglected, and are now little visited. The Austrians repulsed the French here in 1796.

CALEDO'NIA, a kind of poetical name applied to Scotland; being a resumption of that given by the Romans to the country north of the Wall of Antoninus, which ran between the Firths of Forth and Clyde. Among the chief tribes of this region were the Caledonii, whence the whole country has been called Caledonia. Tacitus speaks of the Caledonians as having red hair, large limbs; being naked and barefooted; living in tents without cities; supporting themselves by pasturing cattle, by the chase, and by certain ferries; addicted to predatory warfare; and fighting in chariots with shields, short spears, and daggers. They are supposed to have been of Gaelic or Celtic origin, and to have painted their bodies, whence the name Picti or Picts, by which, according to many writers, they were afterwards known. Agricola was the first Roman general to come in contact with the Caledonians. In 84 A. D. he defeated them, now united to repel a common enemy, under their chief Galgacus, at the Mons Grampius (or Graupius), the site of which has not been determined. The Romans overran the north-east of Scotland as far as the Moray Firth, and formed many encampments (of which remains still exist), but they never reduced the country to a Roman province. Roman coins and military relics have been found in connection with these camps. The name of Caledonii disappears about the beginning of the 4th c., when the inhabitants of Scotland begin to be spoken of as Scots (q. v.) and Picts (q. v.).

CALEDONIA, New. See NEW CALEDONIA.

CALEDONIAN CANAL, a chain of natural lakes united by artificial canals, running across the north of Scotland in a straight line from north-east to south-west, from the North Sea to the Atlantic, through Glenmore or the Great Glen of Albin, in Inverness-shire, and touching Argyleshire at the south end. The sea and fresh

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water lochs in this line are Beauly, Ness, Oich, Lochy, Eil, and Linnhe. The canal was formed to avoid the dangerous and tedious navigation of ships, especially coasting vessels, round by the Pentland Firth, Cape Wrath, and the Hebrides; the distance between Kinnaird's Head and the Sound of Mull by this route being 500 miles, but by the canal only 250, with an average saving of 9¼ days for sailing vessels. The C. C. begins in the Beauly Firth, near Inverness, whence a cut of 7 miles joins Loch Ness, which is 24 by 1¼ mile. A cut of 6 miles joins Loch Ness and Loch Oich, which is 3¼ by ¼ mile. Another cut of 2 miles joins Loch Oich and Loch Lochy, which is 10 by 1 mile; and a fourth cut of 8 miles joins Loch Eil at the village of Corpach, 2 miles north of Fort William. This ship-communication is 60¼ miles long, 37½ miles being through natural lochs or lakes, and 23 miles by artificial cuts. Each cut is 120 feet broad at surface, and 50 at bottom, and 17 deep. The highest part is Loch Oich, which is 94 feet above the sea. There are in all 28 locks, each 170 to 180 feet long, and 40 wide, with a rise or lift of water of 8 feet. Eight of the locks, called Neptune's Staircase, occur in succession near the west end of the canal. Some large mountain streams between Lochs Eil and Lochy are conducted in huge culverts under the canal; and by a new cut, the Lochy water is turned into the Spean. The practicability of this great work was first shown by a survey under government in 1773 by the celebrated James Watt; but it was not till 1803 that it was begun under Mr Telford. The whole line was opened for ships in 1823. After three years of repair, it was re-opened in 1847. Ships of 500 to 600 tons, fully laden, can pass through the canal. The canal and tonnage rates for sailing vessels are each a farthing per mile per ton, and a half of this for vessels under 125 tons. Steamers pay 2d. a ton. Of £1,868,203 expended on this canal, from 1803 to 1850, £1,242 337 were voted by parliament, and £90,748 were from canal dues. Heavy gales and rains in December 1848 and January 1849 did much damage to the canal, which was repaired by a government grant of £10.000. For the year ending April 1876, the total income of the canal was £6741, whereas the expenditure amounted to £9307—a state of accounts by no means exceptional. There is regular steam communication by the canal between Glasgow and Inverness. The scenery is wild and romantic on both sides of the canal, and has many other objects of interest to the tourist, such as Fort William, Ben Nevis, Inverlochy Castle, Tor Castle, the ancient seat of Cameron of Lochiel, Glen Spean, Glen Roy, with its Parallel Roads, Fort Augustus, the Fall of Foyers, and Inverness.

CA'LEMBOURG, or Calembour, the French name for a pun (q. v.).

CA'LENDAR (from CALENDS, q. v.), the mode of adjusting the months and other divisions of the civil year to the natural or solar year. The necessity of some division and measurement of time must have been early felt. The phases or changes of the moon supplied a natural and very obvious mode of dividing and reckoning time, and hence the division into months (q. v.—see also WEEK) of 29 or 30 days was, perhaps, the earliest and most universal. But it would soon be observed that, for many purposes, the changes of the seasons were more serviceable as marks of division; and thus arose the division into years (q. v.), determined by the motions of the sun. It was soon, however, discovered that the year, or larger division, did not contain an exact number of the smaller divisions or months, and that an accommodation was necessary; and various not very dissimilar expedients were employed for correcting the error that arose. The ancient Egyptians had a year determined by the changes of the seasons, without reference to the changes of the moon, and containing 365 days, divided into twelve months of 30 days each, with five supplementary days at the end of the year. The Jewish year consisted, in the earliest periods, as it still does, of twelve lunar months, a thirteenth being from time to time introduced, to accommodate it to the sun and seasons; this was also the case with the ancient Syrians, Macedonians, &c. The Jewish months have alternately 29 and 30 days; and in a cycle of 19 years there are seven years having the intercalary month, some of these years having also one, and some two days more than others have, so that the length of the year varies from 353 to 385 days.—The Greeks, in the most ancient periods, reckoned according to real lunar months, twelve making a year; and about 594 B. C., Solon introduced in Athens the mode of reckoning alternately 30 and 29 days to the month, accommodating this civil year of 354 days to the solar year, by occasional introduction of an intercalary month. A

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change was afterwards made, by which three times in eight years a month of 30 days was intercalated, making the average length of the year 365¼ days. See METONIC CYCLE.

The Romans are said to have had originally a year of 10 months; but in the times of their kings, they adopted a lunar year of 355 days, divided into 12 months, with an occasional intercalary month. Through the ignorance of the priests, who had the charge of this matter, the utmost confusion gradually arose, which Julius Cæsar remedied, 46 B. C., by the introduction of the JULIAN CALENDAR, according to which the year has ordinarily 365 days, and every fourth year is a leap-year of 366 days—the length of the year being thus assumed as 365¼ days, while it is in reality 365 days, 5 hours, 48 minutes, and 50 seconds; or 11 minutes, 10 seconds less. Cæsar gave to the months the number of days which they still have.

So comparatively perfect was the Julian style of reckoning time, that it prevailed generally among Christian nations, and remained undisturbed till the renewed accumulation of the remaining error of eleven minutes or so had amounted, in 1582 years after the birth of Christ, to ten complete days; the vernal equinox falling on the 11th instead of the 21st of March, as it did at the time of the Council of Nice, 325 years after the birth of Christ. This shifting of days had caused great disturbances, by unfixing the times of the celebration of Easter, and hence of all the other movable feasts. And accordingly, Pope Gregory XIII., after deep study and calculation, ordained that ten days should be deducted from the year 1582, by calling what, according to the old calendar, would have been reckoned the 5th of October, the 15th of October, 1582; and in order that the displacement might not recur, it was further ordained that every hundredth year (1800, 1900, 2100, &c.) should not be counted a leap-year, excepting every fourth hundredth, beginning with 2000. In this way the difference between the civil and the natural year will not amount to a day in 5000 years. In Spain, Portugal, and part of Italy, the pope was exactly obeyed. In France, the change took place in the same year, by calling the 10th the 20th of December. In the Low Countries, the change was from the 15th December to the 25th; but it was resisted by the Protestant part of the community till the year 1700. The Catholic nations, in general, adopted the *style* ordained by their sovereign pontiff; but the Protestants were then too much inflamed against Catholicism in all its relations, to receive even a purely scientific improvement from such hands. The Lutherans of Germany, Switzerland, and, as already mentioned, of the Low Countries, at length gave way in 1700, when it had become necessary to omit *eleven* instead of ten days. A bill to this effect had been brought before the parliament of England in 1585, but does not appear to have gone beyond a second reading in the House of Lords. It was not till 1751, and after great inconvenience had been experienced for nearly two centuries, from the difference of the reckoning, that an act was passed (24 Geo. II., 1751) for equalising the style in Great Britain and Ireland with that used in other countries of Europe. It was then enacted that eleven days should be omitted after the 2d of September 1752, so that the ensuing day should be the 14th. A similar change was about the same time made in Sweden and Tuscany; and Russia is now the only country which adheres to the *old style*; an adherence which renders it necessary, when a letter is thence addressed to a person in another country, that the date should be given thus:—April $\frac{1}{13}$ or $\frac{\text{June } 27}{\text{July } 9}$; for it will be observed, the year 1800, not being considered by us as a leap-year, has interjected another (or twelfth) day between old and new style.

The C. of the French Republic remains to be noticed, which was adopted in consequence of a decree of the National Convention in 1793. The midnight preceding the autumnal equinox of 1792 was fixed upon as the new epoch, from which the years were to be reckoned as the Year One, the Year Two, &c. The year was divided into 12 months, each of 30 days, to which new names were given, as *Vendémiaire* (vintage month), *Brumaire* (foggy month), &c.; and instead of weeks, each month was divided into periods of 10 days, called *Primidi, Duodi, Tridi*, &c. Five *complementary* days were added at the end of each year, which were the *Fête du Génie, Fête du Travail*, &c. By Napoleon's command, this new system was abolished, and the use of the Gregorian C. resumed on January 1, 1806.

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CALENDAR OF PRISONERS, in the practice of the criminal law in England, is the technical name given to the list of all prisoners' names in the custody of the sheriff of each county, prepared for the assizes. When the business is over, and the trials concluded, the clerk of assize makes out in writing four lists of all the prisoners, with separate columns, containing their crimes, verdicts, and sentences, leaving a blank column, in which, if the judge has reason to vary the course of the law, he writes opposite the names of the capital convicts—*to be reprieved, respited, transported*, &c. These four calendars, being first carefully compared together by the judge and the clerk of assize, are assigned by them, and one is given to the sheriff, one to the jailer, and the judge and the clerk of assize respectively keep another. If the sheriff receives afterwards no special order from the judge, he executes the judgment of the law in the usual manner, agreeably to the directions of his calendar. In every county, this important subject is settled with great deliberation by the judge and the clerk of assize, before the judge leaves the assize-town; but probably in different counties, with some slight variation, as in Lancashire, no calendar is left with the jailer, but one is sent to the home secretary.

CA'LENDERING is the term applied to the process of finishing by pressure the surface of linen, cotton, and other textile fabrics. It is usually done by passing the fabric between cylinders pressed together with great force; hence the origin of the term, which is a corruption of *cylindering*.

The familiar domestic processes of starching and ironing afford the simplest illustrations of the object and result of calendering. The domestic mangle effects the same object as the flat iron, and is a near approach in construction to the C. engines of the manufacturer, no traversing-box of stones being used in the new patent mangles.

The cylindrical C. machine is said to have been introduced into this country by the Huguenots, driven here by persecution. The cylinders were originally of wood, but the liability to warping is a strong objection to these.

The modern calendar usually consists of four, five, or six cylinders or "bowls" set vertically in a strong iron frame, with suitable driving gear, and furnished with weights suspended over a pulley to produce the required pressure. This sometimes amounts to, or even exceeds, 90 tons, including the weight of the rollers. In a five-roller machine, the arrangement is this: The centre roller is of iron or copper, made hollow for the admission of steam or a red-hot heater, the one immediately above and that directly below it are of paper; and the remaining two, one at the top and the other at the bottom, are of cast-iron. At least one of the rollers is always of paper, as it has more elasticity than metal, and is not liable to warp, like wood. It consists of sheets of brown paper or pasteboard, densely packed and compressed on an iron axis. The edges of these form the surface of the roller, which is turned and polished, an operation of some difficulty.

Before the final rolling in the C. machine, the fabric is first lightly smoothed by passing over warm cylinders. Cotton goods are starched with a starch prepared from flour, and the starch is sometimes thickened with plaster of Paris, porcelain clay, or a mixture of these, to give a ficticious appearance of stoutness, which of course vanishes when the article is washed. For ordinary C. the fabric is then simply passed between plain cylinders, which produces the desired effect by flattening the otherwise round threads. When, by means of a hot cylinder, with a pattern raised upon it, the amount of this flattening is unequal on different parts of the cloth, the beautiful effect known as "watering" is the result. *Glazing* is produced by combined rubbing and pressure; the rollers, one of which is heated, being made to move with different velocities, so that one side of the fabric is rubbed as well as pressed by the roller whose surface moves with the greater rapidity. Before the invention of these rubbing cylinders, glazing was effected by rubbing the surface of the fabric with a polished flint. Calendering is done on a very large scale in some manufacturing towns, such as Manchester and Glasgow. In Dundee, where half a century ago it was not the custom to calender the linen at all, there are now more than 1000 hands employed in this branch of industry. Machines similar in construction to the one above described, but with all the rollers of iron, and also called calenders, are used for rolling india-rubber into sheets for coats, shoes, &c.

CA'LENDS. The Romans made a threefold division of the month into *Calendæ*,

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Nonæ, and *Ides*. The C. always fell upon the 1st of the month; the Nones in March, May, July, and October, on the 7th; and the Ides on the 15th; and in the remaining months, the Nones on the 5th, and the Ides on the 13th. The C. were so named because it was an old custom of the College of Priests on the first of the month to *call* (or assemble) the people together to inform them of the festivals and sacred days to be observed during the month; the Nones received their name from being the *ninth* day before the Ides, reckoning inclusively; and the Ides from an obsolete verb, signifying to divide, because they nearly halved the month. This threefold division also determined the reckoning of the days, which were not distinguished by the ordinal numbers first, second, third, &c., but as follows: Those between the C. and the Nones were termed *the days before the Nones;* those between the Nones and the Ides, *the days before the Ides;* and the remainder, *the days before the C.* of the next month. Thus, the Ides of January, happening on the 13th of that month, the next day would not be termed by a Latin writer the 14th, but *the 19th before the C. of February*, reckoning inclusively, i. e., reckoning both the 14th of February and the 1st of February, and so on to the last, which was termed *pridie Calendas*.

Ad Calendas Græcas, a Roman proverbial saying, practically equivalent to "never." The Roman C. were often appointed as days for payment of rent, interest, &c.; but as the Greeks had no C., a postponement of payment *ad Calendas Græcas*, simply meant a refusal to pay altogether. It is said that the Emperor Augustus frequently used the phrase, which afterwards became a proverb.

CA'LENTURE, a Spanish term (*calentura*) applied to a species of temporary delirium or fever occurring on board ship in hot climates, and probably due to the effect of exposure to the direct rays of the sun. The descriptions of the disease seem rather fanciful and contradictory, and the term is nearly obsolete. See "Dictionnaire des Sciences Médicales."

CALHOUN, John Caldwell, an eminent American statesman, descended from an Irish family who founded the Calhouns' Settlement in South Carolina, was born at Abbeville, South Carolina, March 18, 1782. Having gained distinction at the bar, he was sent to congress in 1811, where he soon made himself the leader of the war-party against England. Author of the tariff of 1816, so favorable to his native state, he in 1817 was named minister of war by President Monroe, and reduced the confused state of affairs in his department to order, and made a great reduction in the expenditure of the army without sacrificing its efficiency.

This early part of C.'s career was marked by broad and patriotic views, to which his subsequent preference of southern interests presented an unfavorable contrast. The tariff of 1828 not being very favorable to the Southern States, C. still adhered to the government, hoping that the president, Jackson, would veto the measure; but as this hope was disappointed, C. went to South Carolina, and there (1829) carried in the legislature the notorious resolution, "that any state in the Union might annul an act of the Federal government." To this decision, Virginia, Georgia, and Alabama gave in their adhesion, and threatened a dissolution of the Union. President Jackson promptly used energetic measures to make this resolution of no effect. C. lost popularity, and despairing of reaching the presidency, resigned his vice-presidency; but soon afterwards was elected into the senate. In 1838, he delivered his famous speech on slavery, and continued to agitate on behalf of the slave-holding interest and for a dissolution of the Union, both with voice and pen, until his death, which took place at Washington, March 31, 1850. In his private character, C. was blameless; but in his career as a statesman he is understood to have implanted in the minds of his partisans those principles which culminated in the late war for the dissolution of the Union. During many years, he had been employed in writing his work on "The Philosophy of Government," in which he vindicates the doctrine of state sovereignty, and which, along with other works, was posthumously published.

CALIA'NO, a small town of the Austrian Tyrol, situated on the left bank of the Adige, about 9 miles south of Trent. It figures in history as the place where the Austrian archduke, Sigismund, won a signal victory over the Venetians in 1487. Being a place of considerable military importance, it was also contested in the campaigns of 1797 and 1809.

CA'LIBRE, or Ca'liber, is a technical name for the diameter of the bore of a fire-

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arm, whether a piece of ordnance or a small-arm. The ordnance from which solid shot are projected are usually denoted by the weight of each shot, as 24-pounder, 68-pounder, &c.; but mortars, and such guns as project shell or hollow shot, are more usually denoted by the C., such as 13-inch mortar, 10-inch shell-gun, &c. The C. of the chief kinds of firearm will be noticed under the proper headings; but it may here be observed, generally, that the C. of English ordnance has been greatly increased within the last fifty years, partly by boring up old guns, and partly by casting new.

CA'LICO-PRINTING is that department of the art of dyeing which takes cognizance of the production of a colored pattern on cloth. It appears to have been first practised at *Calicut* in India—hence the term *calico;* and the *pallampoors*, or large cotton chintz counterpanes, which have been manufactured in the East Indies for centuries, are evidence of the successful practice of the art in that country. From the East Indies, the art spread to Asia Minor and the Levant, thence to Augsburg in Bavaria; from whence, at the beginning of the 18th c., it spread to Alsace in France, to Switzerland, and ultimately to England and Scotland. The term is strictly applicable to the production of colored patterns on cotton cloth or calico; but as now employed, it includes all the processes followed in the formation of a colored pattern on cotton, linen, worsted, and silk goods, as also mixtures of two or more of these, such as the fabric called *de laine*, which is composed of cotton and worsted.

The first operation connected with the printing of cloth is the removal of the surface-hairs or minute threads which communicate a fibrous down or nap to the surface of the cloth, and if allowed to remain, would interfere with the uniform application of the colors. The surface down is got rid of by the process of singeing, during which the cloth is drawn over a red-hot iron or copper bar or plate, or through a series of gas jets. The apparatus generally used for *hot-plate singeing* consists of a furnace surmounted by a metal-plate, which is sometimes ridged on the surface. The cloth having previously been joined at the ends, to make a long length, and been placed on a winch-roller, is first brought in contact with roller brushes, which raise the nap on the cloth, then passes over the white-hot metal cylindrical bar, and is wound on to a second winch-roller. The process is repeated twice on the face of the cloth, being the surface to be printed on, and once on the back. *Gas-singeing* is accomplished by drawing the cloth through brushes, and then over a horizontal pipe, perforated with rows of small holes, or slit from end to end, so that the gas issuing therefrom burns as a narrow sheet of flame. The cloth is not only allowed to come in contact with the burning gas, but the flame is transmitted through the cloth, and a suction-apparatus is often placed immediately above, so as to draw the flame through more effectually. When well singed, the cloth undergoes the process of bleaching (q. v.), and is thereafter calendered. See CALENDERING.

There are several modes of applying the colors to cloth, and these are respectively named—1. The Madder style; 2. The Padding style; 3. Topical style; 4. Resist or Reserve style; 5. Discharge style; and 6. China blue or pottery style. These various processes are at one in being intended to fix upon the cloth the different colors; but they differ from each other more or less in the several steps through which the cloth is passed, though occasionally there is little or no line of separation; and at times the cloth is treated by one method and subsequently by another style.

The *madder style* is that in which a certain fixing agent or mordant is printed on the cloth, which is then introduced into the coloring matter in a dye-vat, when the mordant, having an attraction alike for the fibre of the cloth and for the coloring matter, acts the part of glue or paste, and cements the color to the cloth. Originally, madder was the only coloring substance employed in this style; but now-a-days, by far the greater number of dye-stuffs, vegetable and animal, including cochineal, logwood, &c., are attached to cloth in this manner. The fixing agents or mordants generally employed are different strengths of *red liquor* (acetate of alumina), *iron liquor* (acetate of iron), and mixtures of these. These are thickened with wheat-starch, potato-flour, roasted starch or dextrine, and gum-arabic, so that the mordant may not run when it is placed on the cloth by the pattern-block or by the printing-machine. After the mordant has been imprinted on the cloth, the latter is hung in a warm airy room, where it can easily dry, but where it is at the same

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time surrounded by a moist atmosphere. The result is, that the mordant is decomposed, the acetic acid is evolved, and the alumina or iron is left attached to the fibre of the cloth in the state of an insoluble sub-salt, which cannot be dissolved by water. As some of the mordant is still left in its original soluble condition, it is necessary to wash the cloth free from this, else, during the dyeing operation, the soluble part of the mordant would run on to those parts of the cloth not intended to be colored, and thus produce a blotted appearance. To obviate this, the cloth, having undergone the process of *drying* and *ageing*, is then introduced into a vat containing water, through which is diffused some cow-dung, dung substitute—a preparation of bone ash, sulphuric acid, carbonate of soda, and glue—or bran. The result of this process of *dunging* is the removal of the soluble part of the mordant, as also the starch or thickening agent, leaving the decomposed or insoluble mordant adhering to the fibre. The terms *dung*-fixing, *substitute*-fixing, and *bran*-fixing, have reference to the employment of one or other of these agents at this stage of the operation. When the cloth has been well washed from the dunging, it is introduced into the vat or dye beck containing the coloring matter. The whole is heated by steam-pipes, and the cloth being placed on a sparred reel kept in motion, is repeatedly wound out of the vat, and returned thereto. The result is, that wherever the mordant adhered to the cloth, the coloring matter is attached thereto, and little or no trace of color adheres to the unmordanted parts. The last operation is the *clearing* or *brightening*, during which the colored cloth is introduced into warm baths of water containing soda, soap, or, for the more delicate tints, bran, and is thereafter acted on by weak acid solutions. The object is to clear the colors, and at the same time to confer upon them the property of resisting the fading action of the air and sun for a much longer time. The different shades of color which can be obtained from the same madder beck or vat, with different mordants, are very numerous, and include reds, lilacs, purples, chocolates, and blacks. Thus, when a weak solution of red liquor (acetate of alumina) is employed as the mordant, a light red tint is procured; with a stronger aluminous mordant, a deep red is formed on the cloth; with a more or less dilute solution of iron liquor (acetate of iron), the cloth is colored lilac, violet, or purple; with a strong solution of iron liquor, black is obtained. Indeed, the same piece of cloth stamped in different places with the various strengths of aluminous and iron mordants, and mixtures of these, and immersed in the madder-bath, will be obtained dyed with all the shades mentioned; and in this manner, many of the beautiful variegated colored dresses and handkerchiefs are prepared for market.

The *padding style* in C. is intended mainly for the impregnation of cloth, in whole or in part, with mineral coloring substances. When the cloth is to be entirely colored, it is immersed wholly in a vat containing the mordant. When the color is to appear as a pattern on the fabric, the mordant is applied by a pattern block, or by the printing-machine. In either case, the cloth is thereafter thoroughly dried, and washed in various solutions, and then introduced into a vat containing the substance to form the color. Thus, if a piece of cloth is to be entirely impregnated with *chrome yellow*, it is first treated or *padded* in a solution of 8 parts of bichromate of potash ($KO.2CrO_3$) to a gallon of water dried, and then placed in a vat containing a solution of 6 or 8 ounces of acetate or nitrate of lead ($PbOA$, or $PbONO_5$) to the gallon of water. The result is that the chromate of lead ($PbOCrO_3$) is formed in the tissue of the cloth; and when the latter is washed and dried, the yellow color still adheres to the cloth firm and fast. To print a yellow pattern on cloth, 7 to 9 ounces of acetate of lead, and the same quantity of nitrate of lead, are dissolved in a gallon of water, thickened with starch, and placed upon the cloth according to pattern. After drying, the cloth is first immersed in water containing a little carbonate of soda, and ultimately in a solution of bichromate of potash, when the pattern becomes fixed in bright yellow, insoluble in water. To produce *Prussian blue* on cloth, it is treated with acetate and sulphate of iron, dried, washed with warm chalk-water, and immersed in a very weak solution of yellow prussiate of potash. A pattern in Prussian blue is produced by printing a pattern in the cloth with the iron solutions thickened with gum, and thereafter proceeding as above. Chrome green is produced in a similar way, by using sulphate and acetate of copper, thickened with glue, and thereafter arsenious acid with potash; and so also other colors, such as iron buff or chamois, manganese bronze, &c.

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The *topical type* in C. is the process whereby certain coloring matters which are insoluble in water, and cannot therefore be applied to cloth by the modes suggested under the madder and padding styles, are treated at once with the mordant, and the mixture by one operation transferred by block, or otherwise, directly on the surface or *top* of the cloth, and hence the term *topical*. Indigo, safflower, and arnotto are instances of such insoluble coloring substances; and when these and other dye-stuffs, such as logwood and Brazil wood, are treated with water, thickened with starch and nitro-muriate of tin (known as *spirits*) added, with occasionally a little of other salts, such as nitrate of copper, the result is the formation of *spirit-colors*, which can be printed on the surface of cloth, and possess a certain degree of fixity. The permanency of these *spirit-colors*, however, is very much increased, and the general appearance improved, by afterwards subjecting the goods to the action of steam in a wooden box, when the term *steam-color* is applied.

The *resist style* in C. is that in which certain materials are placed on the surface of cloth, to protect it from the adherence of the mordants, and, consequently, to keep that part of the cloth from being attacked by the coloring matter. These materials are termed resists, reserves, or resist-pastes, and they are divisible into mechanical and chemical. The *mechanical* resists are such substances as fat, resins, oils, wax, and pipe-clay. A common resist for silk and woollen goods is a mixture of 2½ of resin and 1 of suet; and it is principally in the color-printing of silk and woollen dresses and handkerchiefs that mechanical resists are employed, though they are occasionally used for the printing of cottons. The chemical resists may act on the mordant or on the color. Thus, if it be desirable to remove the mordant, and thus leave certain parts of the cloth unable to attach color, the printing of a pattern with some acid substance on the cloth will form with the mordant a soluble salt, which can be readily removed by washing, whilst the parts which have not been so acted on by acid are not dissolved away by the washing, and still retain the full power in the color-vats to cause the adhesion of the color. For this purpose, where an iron or aluminous mordant has been employed, it is customary to print thereon in the requisite pattern, lemon-juice or lime-juice (containing citric acid), tartaric or oxalic acid, and b sulphate of potassa, or a mixture of two or more of these, thickened with pipe-clay, China-clay, gum-arabic, dextrine (British gum), gum-Senegal, or a mixture of these; occasionally, chloride of tin is employed. Sulphate of zinc, sulphate and acetate of copper, and the chloride of mercury, are used to resist the adherence of indigo blue.

The *discharge style* in C. comprehends the employment of similar materials to those used in the resist style, but *after* the cloth has been colored or dyed, and for the purpose of discharging the color, or bleaching the cloth at certain parts, according to pattern. The dischargers for organic coloring matters are chlorine and chromic acid. The chlorine is employed in the form of bleaching-powder (q. v.) and the cloth already dyed is printed with a solution of tartaric acid (or other acid) thickened with pipe-clay and gum, then dried, and passed through a solution of bleaching-powder, when the decoloration occurs, as already explained under BLEACHING. The chlorine is also applied by placing a number of folds of colored cloth between perforated pattern-plates, and subjecting the whole to great pressure; a solution of chlorine (obtained by adding an acid to a weak solution of bleaching-powder) is allowed to percolate down through the perforations of the plates, and the cloth immediately underneath, so that only those spots are bleached, while the rest of the cloth is so highly compressed as to keep the liquid from coming in contact therewith. The well-known Turkey-red handkerchiefs are *patterned* in this way. The chromic acid is generally employed in discharging indigo color. The cloth, already entirely blue, is soaked or padded in bichromate of potash, and then an acid discharger printed thereon; and wherever the acid discharger (tartaric, oxalic, citric, or hydrochloric acid) comes in contact with the blue cloth containing the bichromate of potash, chromic acid is liberated, and destroys the color. Instead of acting upon the colored cloth, the discharger may be employed to carry off the mordant. Thus, cloth treated wholly with a mordant, and thereafter printed with a pattern in acid, has the mordant removed at those parts where the pattern block has placed the acid. Mineral colors can also be discharged in a similar way.

The *China blue or pottery style* in C. is a modification of the topical style, where indigo is deposited on cloth in the insoluble state, and is thereafter manipulated

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with, so as to impregnate the cloth with the indigo more or less strongly, and thus produce different shades of blue.

The above descriptions of the various operations in C. have special reference to cotton cloth; and though many steps of the manipulative processes apply equally well to linen, silk, worsted, and de laines (worsted and cotton), yet considerable modifications in mode of treatment and material employed are required in the successful color-printing of all texture containing animal fibre, such as silk and wool. Where the printing of such fabrics differs essentially from the processes already indicated, special reference will be made under SILK and WOOL. The different coloring matters employed in C. being identical with those used in dyeing, will be considered under the general popular title DYE-STUFFS; and the mode of compounding these into the various colors and shades, will be more appropriately introduced under DYEING.

CA'LICUT, a seaport of the district of Malabar, which, though on the west side of the peninsula of Hindustan, yet forms part of the presidency of Madras. In lat. 11° 15′ n. and long 75° 50′ e. it is distant from Goa and Bombay respectively 200 and 566 miles. It was the first spot in India visited by Vasco da Gama, being then the chief emporium on the coast, with stately dwellings and magnificent pagodas. So populous and powerful was it, that it twice repulsed the Portuguese, slaying their commander in 1509, and expelling Albuquerque himself, after a momentary success on his part, in 1510. It stands near the mouth of a small river of the same name, appearing to have possessed at one time a tolerably good haven. Gradually, however, this harbor has been filled up with sand; and now its anchorage is merely an open roadstead, at a distance, at least for large vessels, of two or three miles from land. Independently of this physical disadvantage, the ravages of war and the competition of superior localities contributed to the decay of Calicut. Accordingly, in 1792, when it fell into the hands of the English, the city was little better than a ruin. Since then, it has made considerable progress, and in 1871 was found to have 47,962 inhabitants. From C., *calico*, is understood to have derived its name, just as *cambric* from Cambrai, in the northeast of France.

CA'LIF (Turk. a successor), the title of Mohammed's successors in temporal and spiritual power, from which the historians of the middle ages designated the Arab empire founded by these princes, the CALIPHATE. This empire, for two or three centuries, exceeded even the Roman empire in extent. As Mohammed died without leaving any sons, a contest arose concerning the inheritance of his power, which terminated (632 A.D.) in the triumph of Abubekr (q. v.), one of his fathers-in-law, over Ali, his nephew and son-in-law. Abubekr now assumed the title of Califet-Resul-Allah—i. e., Representative or Deputy of the Prophet of God. He sent forth his armies for the extension of Mohammedanism, and after several victories over the forces of the Byzantine empire, conquered Syria. He was succeeded in 634 by Omar, another father-in-law of Mohammed, by whom Egypt and Jerusalem were annexed to the califate. He assumed the title of Emir-al-Mumenin—i. e., Prince of the Faithful—a title which all subsequent califs retained. Othman, a son-in-law of the Prophet, was the third C., and was elected by six persons appointed by Omar before his death. During his reign (644—655 A.D.) the Arabian empire grew with extraordinary rapidity, being extended into Persia, and westward along the north coast of Africa as far as Ceuta. The Byzantine emperors recovered Egypt; but it was wrested from them again at a prodigious expense of blood. The people of Medina elected Ali-ben-Abi-Taleb as C. upon the death of Othman. The Shiites regard him as the first true Imam or high-priest, and honor him and his son Hassan almost equally with Mohammed himself. Contests against rivals prevented him from doing much for the extension of the califate. Moawijah, the governor of Damascus, having made himself really independent during Ali's life, and having extended his power over Syria, Egypt, and part of Arabia, became C. in 661, and founded the dynasty of the Ommiades, making the califate hereditary. He removed the seat of the califate to Damascus. His armies ravaged Asia Minor, and laid siege to Constantinople, but could not take it. He made important conquests, however, in Central Asia. The califate did not remain long in the family of Moawijah, and it frequently happened that in one or other of the subject countries a governor raised himself to a temporary independence; and rival califs frequently contended for power. Abdalmelek (685—705 A.D.)

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united all the Moslems under his dominion. Under his son, Walid I., the califate reached its zenith of prosperity, the Arabs conquering Turkestan in 707, Galatia in 710, and Spain in 711. Under Hesham, the progress of the Arabs in the west was arrested by Charles Martel at Tours (732 A.D.) and at Narbonne (736 A. D.). The dynasty of the Ommiades in Asia terminated with Merwan II., in 752, giving place to that of the Abbasides. But a branch of the Ommiades founded an independent califate at Cordova, and another founded one in Arabia, which subsisted till the 16th century. Abul-Abbas (750—754 A. D.), the first Abbaside C., signalised himself by his cruelty and the torrents of human blood which he shed. His successor, Abu-Jafar, called Al-Mansur, a patron of the arts, but a persecutor of Christians, founded Bagdad (q. v.) and removed the seat of the califate thither. From the beginning of the 9th century the Arab empire, which had suffered much from corruption and internal disorganization under the last califs of the Ommiade dynasty, and had never completely recovered, showed increasing signs of decay. Even under the C. Harun-al-Raschid, whose praises the eastern poets were accustomed so much to celebrate, independent kingdoms were established (800 A. D.) by the Aghlabides in Tunis, and the Edrisides in Fez. In 821, Taher, the governor of Khorassan, made himself independent, and established a dynasty there, and other governors of provinces followed his example. But under the C. Al-Mamun, the Arabians conquered Sicily and Sardinia, the former of which they held till it was taken from them in 1035 by the Normans; and the latter till it was conquered by the Pisans in 1051. The C. Motasem (833—842 A. D.) was the first to employ Turkish soldiers; but the practice was followed by his successors; and the Turkish body-guard soon became a formidable power in the califate, and about the middle of the 9th c. assumed the right of deciding the succession to the throne. Many of the califs, meanwhile, were base voluptuaries, and of the others, some were of little capacity, and their power rapidly declined. Ere the middle of the 10th c., the califs themselves exercised a mere nominal sovereignty, whilst the emirs, like the mayors of the palace towards the close of the Merovingian dynasty among the Franks, possessed all real power. The princes of the Fatimide dynasty, which succeeded that of the Aghlabides in Tunis, having made themselves masters of Egypt in 970, assumed the title of C., so that there were now three Califates—at Bagdad, at Cairo, and at Cordova. In the 11th c., the califs of Bagdad were still acknowledged as the spiritual chiefs of all the Moslems; but their temporal power scarcely extended beyond the walls of Bagdad. Bagdad itself became the prey of a Mongol horde in 1258, and the representative of the califs fled to Egypt, where, under the protection of the Mamelukes, who had made themselves masters of that country in 1250, he retained his title and spiritual power, which he transmitted to his successors, who continued to reside there till the Turks conquered Egypt in 1517, when the last of them was carried to Constantinople; and since that time the Turkish Sultans have assumed the title of C., and claimed to be regarded as the spiritual chiefs of all the Moslems, a claim to which little respect has ever been paid except within the limits of their own empire.

CALIFO'RNIA. This name was at first applied to a peninsula on the west side of Mexico, but was gradually extended to an indefinite portion of the adjoining continent, as far north as the parallel of 42°. The original C., however, and its augmentation were distinguished from each other as Old and New, Lower and Upper. In 1848, partly by conquest and partly by purchase, continental C., down to the parallel of 32° 2′, was ceded to the United States. After existing as a *territory* for two years, it was, in 1850, constituted one of the United States, bounded n. by Oregon, e. by Nevada and Arizona, s. by Lower C., and w. by the Pacific. Between the two Californias of the present day, the American one and the Mexican one, there is nothing in common but the name.—1. *Mexican C.* is the peninsula above mentioned, which, though considerably longer than Great Britain, is yet so narrow as to be very little larger than Scotland. From end to end, it is one ridge of mountains, which here and there rise to about 5000 feet above the sea. A few favored spots yield fruits and grains in abundance; but, generally speaking, the productions are unimportant, for even trees, and those of no great size, are found only towards the southern extremity of the country. The population does not exceed 25,000—the oldest and most considerable town, Loretto, on the east side, containing barely 1000 inhabitants. On the west side is the magnificent harbor, peculiarly

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valuable on a coast so destitute of shelter, formed by the Bay of Magdalena and the island of Santa Margarita.—2. *American C.*, vaguely claimed, under the name of New Albion, by Drake for England in 1579, lay unoccupied till 1767, when it was invaded by Franciscan friars, the successors in Mexico of the newly expelled Jesuits. These zealous apostles, backed, when necessary, by armed coadjutors, planted various missions, bringing under their influence, such as it was, the great mass of the aborigines. Under such circumstances, the new province became pre-eminent, even in Spanish America for everything that could paralyse the progress of a community. Anglo-Saxon speculators engrossed most of the trade; American trappers walked through the land as if it had been their own; the Muscovites established, in the north, a town under the ominous title of *Ross* or *Russia*; and a Swiss adventurer of the name of Sutter, who had carved out for himself a *New Helvetia*, virtually set the government at defiance. But the discovery of gold in Sutter's mill-race during 1847, and the political transfer of 1848, taken together, changed, as if by a miracle, the aspect of affairs. The matchless harbor of San Francisco became the grand mart on the Pacific, presenting a centre of attraction to the restless and energetic of every race and every clime. Between 1850 and 1855, the population increased from 92,597 to 327,000; in 1870 it was 560,247; and in 1880 it was about 864,694, of whom 75,000 were Chinese. The total yield of gold in this state up to 1875 was about 1,000,000,000 dollars. In 1874 the value of the gold and silver produced was 20,300,531 dollars, and in 1875, 17,758,151 dollars. C. possesses the richest quicksilver mine in the world—that of New Almaden—which at one time produced from 2,500,000 lbs. to 3,500,000 lbs. per annum. It now yields about 1,000,000 lbs. In 1864, 15,000 tons of copper were exported, to be smelted at Swansea and Boston, but not nearly so much is now produced. Platinum has been found in many of the placers. There is coal in nearly all the coast counties; and asphaltum is produced by many springs along the southern coast. Other mineral products are iron, tin, and borax. The yield of wheat in 1870, was 16,676,703 bushels; of barley, 8,788,490. In the year 1875, 8,000,000 gallons of wine were made, the product of 80,000,000 vines. Silk culture is making rapid progress; and the woollen factories of C. consume nearly 6,000,000 lbs. of wool annually, while about 30,000,000 lbs. are exported. Manufacturing industry has lately greatly increased, the chief manufactures being woollen goods, flour, iron, glass, wine, sugar, and silk. The total value of manufactured articles produced in 1870 was 66,595,556 dollars. The total value of imports in the year ending June 30, 1871, was 20,884,907 dollars: of exports, 24,647,520 dollars.

The country is mountainous, and is cut into coast and interior by a subordinate range from Oregon. The interior is subdivided into the valleys of the Sacramento and the San Joachin—two rivers from the north-east and the south-east, which enter the noble haven of San Francisco. The former is the chief seat of the "diggings." Since the completion of the Pacific Railway, terminating in San Francisco, C. has been visited by many pleasure-seekers attracted by its magnificent scenery. The most celebrated district is the Yosemite Valley (q. v.). C., with a lovely and salubrious climate, produces fruits and grains freely, under advantageous circumstances of soil and situation. In the growth of timber, however, it appears to be almost unrivalled. Fremont measured one tree that was 21 feet in diameter, or 66 in circumference; and another has been seen, which, with a length of 150 yards, is nearly 120 feet in girth. A *Sequoia gigantea* in Mariposa county is 274 feet in height. Besides San Francisco, the state contains the cities of Sacramento (the capital), Oakland, Stockton, San José, Los Angelos, Marysville, and San Diego, with the second best port in the state. There are several Protestant and Catholic colleges in C., and education is progressing.

CALIFORNIA, Gulf of, an arm of the Pacific Ocean, which divides the peninsula above described from the rest of Mexico. It was originally known as the Sea of Cortez, having been discovered under his auspices, and explored by himself; and it has, from its shape, been occasionally designated the Adriatic of the New World. It is 700 miles in length, and varies in width from 40 to 100 miles. At its northern extremity, it almost touches the territory of the United States, receiving therefrom the united streams of the Gila and the Colorado. The gulf contains many islands, particularly towards its head, and has long had a pearl-fishery. At the east side of its entrance stands Mazatlan, on a river of the same name, now the most frequented port of the neighboring regions.

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CALI'GULA, Caius Cæsar Augustus Germanicus, Roman emperor (37—41 A. D.), the youngest son of Germanicus (nephew of Tiberius) by Aggrippina, was born, 31st August, 12 A. D., at Antium, and was educated in the camp, where the soldiers gave him the by-name C., from the half-boots (*caligæ*) which he wore. On the death of his brother Drusus, he was made augur in his stead; and on the death of Tiberius (37 A. D.), who, it was suspected, had received foul play at his hands, it was found that he had been appointed co-heir along with the grand-son of Tiberius, but the senate and the people allowed C. supreme and sole authority. In the beginning of his reign, he appeared hardly likely to fulfil the threat of Tiberius, who had talked of educating C. "for the destruction of the Roman people." He was, to appearance, lavishly generous and merciful, pardoning even those who had been the instruments of cruelty against his own family. But this ostentatious magnanimity was itself a disease, an unwholesome affectation, founded on no principle, or even humanity of heart, and co-existed with the most savage voluptuousness and lust. Consequently, when illness, the result of his vicious life, had weakened his faculties, the lower qualities of his nature obtained the complete mastery. In addition to the senseless prodigality with which he commenced his career—expending in one year the enormous wealth left by Tiberius (720 millions of sesterc s)—he began to manifest the most barbarous propensities. He banished or murdered his relatives, excepting his uncle Claudius and his sister Drusilla (with whom he carried on incestuous intercourse); filled Rome with executions, confiscating the estates of his victims; amused himself, while dining, by having victims tortured and slain in his presence; and uttered the wish "that all the Roman people had but one neck, so that he might decapitate Rome at a blow!" To vie with Xerxes, he made a bridge of ships over the bay between Baiæ and Puteoli (a distance of three Roman miles and six hundred paces), and celebrated the exploit by a costly banquet on the middle of the bridge, and by collecting on it great numbers of people, and causing them to be drowned. His favorite horse was stabled in a palace, fed at a marble manger with gilded oats, was made a member of the college of priests, and afterwards raised to the consulship. As a climax to all his absurdities, he declared himself a god, and had temples erected, and sacrifices offered to himself. To gratify his monstrous desires, he shrunk from no infamy; he robbed, plundered, and taxed his subjects to a degree which seems almost incredible, and when even these means proved insufficient, he established a brothel in his own palace, and sent out his slaves to solicit the public patronage for it. At length a conspiracy was formed against him, and he was assassinated 41 A. D.

CALI'PPI CY'CLE. See PERIOD.

CALI'TRI, a town of Italy, in the province of Avellino, near the Ofanto, and about 7 miles east-north-east of Conza. It has a population of 6200, who are chiefly engaged in agricultural pursuits. Sheep are reared to a considerable extent in the vicinity.

CA'LIVER was a matchlock or firearm about midway in size and character between an arquebus and a musket; it was small enough to be fired without a rest or support.

CALI'XTINES, a Bohmian religious sect, so named from the Latin *calix*, a cup, because they contended for giving the cup, as well as the consecrated wafer, to the laity. Their confession of faith (1421) contained the following articles: 1. That the word of God ought to be freely and regularly preached by the priests of the Lord throughout Bohemia; 2. That the eucharist in both kinds ought to be administered to all burdened with "no mortal sins," according to the language and commaud of the Saviour; 3. That the clergy should separate themselves from secular affairs; 4. That all "mortal sins," and especially public ones, such as debauchery and simony, and any other disorders contrary to the law of God, should be prevented or punished by those who were the lawful authorities in such matters. In other main points they were moderate followers of John Huss, and were opposed to the more extreme sect of Taborites (q. v.). Their peculiar articles of faith were conceded by order of the council at Basel (1433); and having prevailed over the Taborites in the conflict which took place at Boehmischbrod 30th May 1434, they became the dominant party, in Bohemia, and exercised considerable influence over political affairs. Gradually, however, the C. lapsed from the severity of their four

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articles, while the action of the energetic Taborites, and later of the Bohemian Brethren (q. v.), rendered them completely powerless. At the beginning of the 16th c., they had ceased to possess any importance, and only served to prepare the way for Protestantism.

CALIXTUS, Georg (properly, *Callisen*), an eminent theologian of the Lutheran Church, was born 14th Dec. 1586, at Medelbye in Schleswig; studied at Flensborg and Helmstedt; and, in 1605, became professor of philosophy in the latter of these cities. Two years after, he betook himself to theology, and attracted great attention by the breadth and originality of his views. After travelling for some time in Germany, Holland, England, and France, where he made the acquaintance of the most learned men of his time, he returned to Helmstedt in 1613, and was appointed professor of theology. His genius, the depth of his knowledge, and his large experience of the world and of men, which he had acquired in his travels, developed in him a spirit of great tolerance towards all who held their religious opinions honestly, whatever these might be. Although his dissertations on the Holy Scripture, transubstantiation, communion in one kind, &c., are acknowledged by learned Catholics to be about the most solid and admirable which have been composed by Protestants against the distinctive doctrines of Catholicism, he was, on account of some statements in his work entitled "De Præcipuis Religionis Christianæ Capitibus" (Helmstedt, 1613), which seemed favorable to Catholic dogmas, and of others in his "Epitome Theologiæ Moralis" (Helmstedt, 1634), "De Tolerantia Reformatorum," &c. (Helmstedt, 1658), which approached too near to the Reformed or Calvinistic standpoint, declared guilty of abominable heresy by the adherents of the letter of the Concordienformel—i. e., the orthodox and dogmatically rigid Lutherans. C. felt keenly that the polemical harshness of Lutheranism was a serious obstacle in the way of a great Catholic Christianity, and that Protestantism must assume another form before it could hope to become the religion of Europe. Under this conviction, C. endeavored to shew that the oldest and most fundamental articles of the Christian faith—viz., the facts embodied in the "Apostles' Creed"—were common to all Christian sects. In subsequent dissertations, having stated that the doctrine of the Trinity was less distinctly taught in the Old than in the New Testament, and that good works were necessary to salvation; and finally, at the religious conference of Thorn, in 1649, whither he was sent as a mediator by the Elector of Brandenburg, having been on more intimate terms with the Calvinistic than the Lutheran theologians, C. was was accused of apostasy. Fortunately, however, he had powerful friends, who stood firmly by him, and through their help he was enabled to retain his professorial chair till his death, on 19th March 1656.

CALL, a term often used in reference to various theological and ecclesiastical subjects.—1. The command or invitation to believe in Jesus Christ, is designated the *call of God*, or the *gospel call*. Calvinistic theologians make a distinction between a *general* call and a *special* or *effectual* call. The former is addressed, they say, to all to whom the word of God comes; but it is insufficient of itself to induce any man to the act of faith, and requires in order to its efficacy, that it be accompanied by the special and irresistible grace of the Holy Spirit. They are careful, however, to state that the general or outward calling by the word always precedes and accompanies the special and effectual calling by the Spirit. The notion of an inward call by the Spirit of God in the soul, unconnected with outward calling by the word, belongs not to Calvinistic, but to mystic theology.—2. A call to office in the church, and particularly to the ministry of the gospel, is regarded by Christians generally as proceeding from God; and the Church of England requires of candidates for ordination an express profession that the trust they are so moved of the Holy Ghost.—3. A call by the people who are to be under the pastoral care of a minister has been generally regarded in the Christian church as necessary to the establishment of the pastoral relation. But there have been great differences of opinion as to what constitutes a sufficient call, and great differences of practice with regard to it. Some of the principal ecclesiastical dissensions in Scotland have had their origin in this question. The election of a pastor by the *Christian people* of his *parish* or *congregation*, has been contended for by many as the true call, or the best kind of it; others, approving of patronage with certain limitations, contended no less earnestly for the right of the people to be consulted, so that without their concurring by a call, the patron's presentee should not be held entitled to be inducted into the pastoral office;

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and according to the practice of the Church of Scotland, this concurrence was always at least formerly sought. Questions concerning the call and its proper value, supposed to have been determined by the Earl of Aberdeen's Act, passed when the *Disruption* of the Church of Scotland took place in 1843, were not finally settled until the passing of the Act for the Abolition of Patronage (1874), which gives the right of calling to the congregation. See SCOTLAND, CHURCH OF; FREE CHURCH OF SCOTLAND; and PATRONAGE.

CALL, a stipulated sum to be paid towards a share in a joint-stock undertaking. For example, in a £10 share, there are usually at least four calls of £2, 10s. each, the calls being made at intervals of not less than three months.

CALL, a military musical term meaning a signal on the trumpet.

CALL is a metal whistle used by the boatswain and his mate on shipboard. Various strains or kinds of sound produced denote signals or orders for hoisting, heaving, lowering, veering, belaying, letting-go, &c. These sounds are as much attended to by seamen, as those of the drum, bugle, and trumpet are by soldiers. At one time, a gold call, with a chain, used to be the badge of an admiral.

CALL OF THE HOUSE is an imperative summons to every member of parliament of either House on some particular occasion, when the sense of the whole House is deemed necessary. In the *House of Lords*, when any urgent business is deemed to require the attendance of the lords, it has been usual to order the House to be called over; and this order has sometimes been enforced by fines and imprisonment upon absent lords. On some occasions, the Lord Chancellor has addressed letters to all the peers, desiring their attendance, as on the illness of George III., 1st November 1810. The most important occasion on which the House was called over, in modern times, was in 1820, for the trial of Queen Caroline.

When the *House of Commons* is ordered to be called over, it is usual to name a day which will enable the members to attend from all parts of the country. The interval between the order and the call has varied from one day to six weeks. If it be really intended to enforce the call, not less than a week or ten days should intervene between the order and the day named for the call. The order for the House to be called over is always accompanied by a resolution, "that such members as shall not then attend, be sent for, in custody of the serjeant-at-arms." And it was formerly the custom to desire the Speaker to write to all the sheriffs to summon the members to attend. On the day appointed for the call, the order of the day is read and proceeded with, postponed, or discharged, at the pleasure of the House. If proceeded with, the names are called over, according to the counties, which are arranged alphabetically. The members of a county are called first, and then the members for every city or borough within that county. The counties in England and Wales are called first, and those of Scotland and Ireland in their order. This point is mentioned, because it makes a material difference in the time at which a member is required to be in his place.—See May's "Proceed. in Parl., on Attendance of Members."

CALL TO THE BAR is the formal expression by which the admission of law-students to the rights and privileges of the degree of barrister in England and Ireland is publicly announced. In Scotland the corresponding expression is *Passing Advocate*. See BARRISTER; INNS OF COURT; and ADVOCATES, FACULTY OF.

CA'LLA, a genus of plants of the natural order *Araceæ*, or, according to some botanists, of the natural order *Orontiaceæ*, which is distinguished from *Araceæ* only by having hermaphrodite flowers. The genus *Calla* is characterised by a flat spathe (q. v.), within which is a cylindrical spadix (see SPATHE) covered with naked flowers, appearing as a mere mixture of stamens and pistils, and a one-celled ovary with 6—8 erect ovules. The known species are few, and natives of very different climates. *C. palustris* is found in swamps in Europe, Siberia, and North America, but not in Britain. It has a creeping root-stock, and heart-shaped, stalked leaves, the midrib of which is prolonged beyond the blade into a point; the spathe is white, and the spadix yellow. The root-stock is extremely acrid and caustic, but being deprived of its acridity by grinding, boiling, and macerating, is made by the Laplanders into a kind of bread called *Missebroed*, which they hold in high estima-

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tion.—The well-known and beautiful *Richardia Ethiopica* was formerly included in this genus, and is often still called Calla.

CA'LLANDER, a village in Perthshire, on the left bank of the Teith, 16 m. n. w. of Sterling. It lies in a beautiful and romantic situation, surrounded by high mountains and Highland lakes. Hence it is much frequented by tourists, who make this place a centre to visit Benledi, the Troesachs, the Bracklin Falls, and Lochs Lubnaig, Venuachar, Achray, and Katrine. Pop. (1871) 1870.

CALLA'O, the port of Lima, the capital of Peru, connected with that city by a railway of 6 miles in length. It stands in lat. 12° s., and long. 77° 13′ w. Fine harbor-works, with extensive pier and dock accommodation, were completed in 1875. The roadstead is large, free from rocks, and safe, being sheltered by the island of San Lorenzo. The exports are guano, specie, copper, cotton, bark and hides. The value of exports and imports is about £6,000,000 annually. C. contains about 20,000 inhabitants. The present C. dates only from 1746, when the original city was submerged and destroyed by an earthquake.

CALLCOTT, Sir Augustus. This name has been erroneously spelled CALCOTT (q. v.)

CALLCOTT, John Wall. See CALCOTT.

CA'LLERNISH, a district on the west coast of the island of Lewis, about 16 miles from Stornoway, remarkable for its circles of Standing Stones (q. v.). There are four circles, at no great distance from one another, but without any visible relation. The principal one is of a more than usually elaborate design. "A double line of upright stones run parallel to each other in a northerly direction, while a single line of similar stones is projected from the south, east and west points, thus giving a cruciform figure to the structure. A stone of larger dimensions than any of the others occupies the centre of the circle, and completes the whole. . . . . That the position was chosen and laid down from astronomical observation, can easily be demonstrated by visiting the spot on a clear night, when it will be found that by bringing the upper part of the single line of stones extending to the south to bear upon the top of the large stone in the centre of the circle, the apex of that stone coincides exactly with the pole-star. . . . . The stones themselves are not columnar, or shaped into any form; they are simply broad, flat blocks of gneiss—the all-prevailing rock from the Butt of the Lewis to Barra Head. The following are their dimensions: diameter of circle, about 40 feet; length of west line, 48 feet; length of east line, 38 feet; length of south line, 69 feet; length of avenue, 270 feet; breadth of avenue, 27 feet; average height of stones, 6 to 8 feet; height of centre stone, 12 feet. There are 18 stones in the circle, including the centre one, 19 in the avenue, 5 in each of the east and west, and 6 in the south arm. The measurements of height are taken from the present level; but it must be borne in mind that there is a bed of peat moss, 4 or 5 feet thick, through which the stones rise from the clay beneath; this gives a height of 16 to 17 feet to the centre stone, and from 10 to 13 feet to the others, exclusive of the foundation."—"Notice of the Stone Circle at Callernish," communicated to the Society of Antiquaries of Scotland, by Mr Henry Callender, March 1857.

CALLICHTHYS (Gr. *kalos*, beautiful, *ichthys*, a fish), a genus of fishes of the family *Siluridæ* (q. v.), having the body almost entirely covered by four rows of large, hard, narrow, scaly plates, two rows on each side. The head is also protected by a sort of helmet. The mouth is small, the teeth very small; two long barbules hang from each angle of the mouth. The species of this genus are natives of warm climates, particularly of South America. They are interesting because when the streams or pools which they inhabit dry up, they make their way across the land to some other piece of water, even although at a considerable distance. They also sometimes bury themselves in the mud of wet meadows, out of which they are digged. They have no special organs for carrying a supply of water with them, like the climbing perch, but are supposed to retain a little between the plates of their body. A still more interesting part of the natural history of these fishes is their making regular nests, generally of leaves, in which they deposit their eggs, near the margin of the water, at the beginning of the rainy season, the male and female uniting in watching them until they are hatched. These habits are shared by the

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species of the allied genus *Doras*, in which the lateral plates are broader, keeled, and each ending in a spine.

CALLI'GONUM, a genus of plants of the natural order *Polygoneæ* (q. v.) having a quadrangular fruit (*achenium*, (q. v.), winged at the angles. The best known species is *C. Pallasia*, a succulent shrub found on the sandy steppes near the Caspian Sea, and in the lower part of the basin of the Volga, where its acid fruit and its also acid shoots often serve to allay the thirst of the Kalmucks and of weary travellers. Its root strikes deep into the sand, is swollen at its upper part, and when cut there, gives out a nutritious gum resembling tragacanth (q. v.), which is also obtained by pounding and boiling it, and on which the Kalmucks feed in times of scarcity.

CALLI'MACHUS, an eminent poet, grammarian, and critic of the Alexandrian period, flourished about the middle of the 3d c. B. C. He was of a distinguished family at Cyrene, in Libya; taught grammar and belles-lettres in Alexandria; was a favorite of Ptolemy Philadelphus, and his successor, Ptolemy Euergetes; and was made principal librarian of the Alexandrian Library. He wrote many works on the most various subjects (Suidas mentions 800), but only fragments are extant; nor have we many of his poems; but the poems which we have, bear the marks of an age when the artificial had obtained a preference over the natural.

CALLING THE DIET is the Scotch term for *Arraignment* (q. v.), although the forms are different. In Scotland, excepting in cases of high treason, there is no grand jury, but the procedure is briefly as follows: Before a prisoner can be tried, a written or printed copy of the indictment preferred against him must have been served fifteen days before the trial, with a copy of the list of witnesses to be examined against him, and also of the jury panel. When, therefore, he is placed at the bar of the court, and called on to plead, he is presumed to know the nature of the charge made against him. But if it be desired by him, or by his counsel, the clerk in the first instance reads the indictment aloud in open court—the same being a well prepared syllogistic statement of the facts, which the prosecutor is prepared to prove. He is then called upon to state his objections to the relevancy, and to have such relevancy disposed of by the court, before being called on to plead to the fact. If the judgment of the court is in favor of the objection, the prosecution for the time fails, and the prisoner is sent back to jail, to abide another indictment, unless the prosecutor chooses to abandon the case against him altogether. See INDICTMENT, VERDICT, DEFENCE.

CA'LLINGER, one of the hill-forts of Bundelcund (q. v.), elevated about 700 feet above the adjacent plain, and separated from a neighboring range of mountains by a ravine of 1200 yards in width. It is in lat. 25° n., and long. 80° 32' e., being 113 miles to the south-west of Allahabad. From its position and size, C. must at one time have been a place of great strength. It was stormed by the British in 1812. At the south-east base of the rock stands a town of the same name, which, though it is now much decayed, yet bears testimony to its ancient extent and grandeur. The locality is famous for its excavated temples of Siva.

CALLIO'NYMUS. See DRAGONET.

CALLI'OPE (i. e., the sweet-voiced) was, according to the ancients, the first of the Muses (q. v.), and presided over epic poetry, or over poetry in general. She was said to be the mother of Orpheus, of the Sirens, &c. She was usually represented with a style and wax tablets.

CA'LLIPERS, a kind of compasses with curved legs, used by turners and other workmen for measuring the diameters of cylindrical, spherical, and other curved work. The C. are laid over the work, and opened or closed until both points just touch the periphery; then the C. are laid upon a rule, and the extent of their opening measured, or the size is compared with a pattern.

CALLI'STHENES, of Olynthus, was the son of Hero, a cousin of Aristotle. C. was born about 360 B.C.; he was educated by Aristotle along with Alexander the Great. He devoted himself to the study of natural and political history, and accompanied Alexander the Great in his expedition to India. He incurred the displeasure of the courtiers and royal favorites, and of Alexander himself, who was displeased by his remonstrating against his intended assumption of divine honors,

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and in general by his bold, indiscreet, outspeaking ways; and he was put to death on a pretended charge of treason, 328 B.C. Only a few fragments of his historic works remain, and these are not valuable. The "History of Alexander," ascribed to him, of which there are several MSS. in the Paris Library, is evidently a production of the 7th c., and rather a romance than a history.

CA'LLITHRIX. See SAGOUIN.

CA'LLITRIS. See SANDARACH.

CALLO'SITIES. See CORNS.

CALLOT, Jacques, one of the most eminent artists of his time, was born at Nancy, 1592. Proceeding to Rome, he commenced drawing and engraving under Thomassin in his eighteenth year. He next went to Florence, where, by numerous spirited etchings, he gained great fame, and engraved for Cosmo II., Grand Duke of Tuscany, a series of plates of court-festivals, &c. When his patron died (1621), C. returned to his native place, and increased his reputation by a copious series of etchings, including six plates of the siege of Breda. By order of Louis XIII., who invited C. to Paris, etchings of the sieges of Rochelle and the Ile Rhé were executed; but C. refused to commemorate by art the capture of his native town, and, declining the pension offered by the king, returned to Nancy, where he died, 1635. His activity as an artist was marvellous. Of his engravings, 1800 are still preserved at Dresden. As helps to a vivid conception of the manners, conditions of life, events, &c., in the 17th c., they are invaluable. C.'s "Misères de la Guerre," a series of 18 plates, are especially celebrated.

CALLU'NA. See HEATH.

CA'LLUS. This term was employed in old surgical works, and is still used popularly, to indicate the exuded material by which fractures of bones are consolidated together. If the broken ends are accurately adjusted to each other, there is no projection of C., but merely a slight deposition of it between the two surfaces; if, however, the adjustment is not accurate, the C. is effused in such quantity as to fill up any interspaces that may exist, and as often to form a considerable hard swelling round the seat of the fracture; any excess is, however, usually absorbed during the last stage of the repair of a fracture. When the broken ends are allowed to move upon each other—which, of course, should be always prevented, if possible—a ferule of new bone, encircling both fragments for some little distance, so as to splice them together, till they are united by a permanent C., is formed; this is termed a *provisional* callus.

CALMET, Augustine, an exegetical and historical writer, and learned Benedictine, was born at Mesnil-la-Horgne, near Commercy, February 26, 1672, and, in 1689, entered the order of Benedictines. In 1698, he was appointed teacher of philosophy and theology in the Abbey Moyen-Moutier; in 1704, sub-prior of a convent of learned monks at Münster, in Alsace; and in 1706 he went to Paris, to superintend the publication of his "Commentary on the Bible." He was afterwards appointed prior at Lay (1715), Abbot of St Leopold (1718), Abbot of Senones in Lorraine (1728), and died at Paris, October 25, 1757. His exegetical writings have been commended and studied with advantage by both Roman Catholics and protestants. The "Commentary on the Bible" (23 vols., Paris 1707—1716), though marked by the author's deficient knowledge of the oriental languages, contains valuable researches in biblical antiquities. C.'s "Historical and Critical Dictionary of the Bible" (4 vols., Paris, 1722—1728) was translated into English, German, and other languages, and has passed through many editions. His other works—a "History of the Bible," and of the "Jews" (1718), and a "Universal History" (1735—1771)—are mere compilations; but his "History of Lorraine" is founded on original researches. Solid criticism and vigorous intellect are wanting in all his works.

CALMS, or CALM LATITUDES are those parts of the ocean, near the equator, which are subject to total absence of wind for long periods together. The part of the ocean where C. are most looked for, is between the region of the trade-winds and that of the variable winds. See WINDS. It is almost as much dreaded by seamen as a region of storms, for the ship is unnavigable; and during a calm of many weeks, food and water may be nearly exhausted, at a point too far

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from land for boats to reach it. Where a calm occurs unexpectedly, it is likely to be followed by violent storms.

CA'LMUCKS. *See* KALMUCKS.

CALNE, a parliamentary borough and ancient town of Wiltshire, on the river Marden, 31 miles north-north-west of Salisbury. It lies in one of the many valleys in the chalk escarpment of this part of England, with the plateau of the Marlborough Downs and Salisbury Plain on the east and south. In 1863, a branch line was opened to C., six miles from the Chippenham station of the Great Western Railway. The principal industry is the curing of bacon; and there are also flax, paper, and flour mills. The manufacture of woollens, formerly of importance, is now almost extinct. There is also a weekly corn-market. Pop. of the town in 1871, 5315. The parliamentary borough, formerly returning two members to parliament, but now only one, includes part of Blackland and Calstone. Many Roman remains have been found here. The West-Saxon kings had a palace at Calne, but no traces of it now remain. At a synod held here by St Dunstan in 977, relative to the celibacy of the clergy, the floor of the room in which the synod sat gave way, precipitating all to the ground but St Dunstan, who presided. On an almost perpendicular declivity 3 miles east of C. is the figure of a *horse*, 157 feet long, in a spirited attitude. It was cut out in white chalky ground in 1780 by Dr. Allsopp, and is visible 50 miles off. Dr Priestley resided at C. 1770—1780.

CALO'EE. *See* BOEHMERIA.

CALOMARDE, Don Francisco Tadeo, Count, a Spanish statesman, was born in 1775 at Villel, in Aragon. He studied at Saragossa, where he passed as an advocate. After the expulsion of the French, and the return of Ferdinand VII. in 1814, C. was among the first to hurry to Aragon, and do homage to him as an absolute monarch. As a reward of his obsequious celerity, he obtained the highest office in the *Secretaria General de Indias*, but lost it on account of accepting a bribe. On the restoration of the constitution of 1820, he unsuccessfully courted the favor of the Liberals; but when the French army in 1823 enabled the king once more to rule despotically, C. was appointed secretary of the *Cámara del Real Patronato*, one of the most influential offices in the kingdom. Not long after, the king made him Minister of Justice. While he held this function, he persecuted the Liberals with cold-blooded savageness, recalled the Jesuits, reopened the monasteries, and closed the universities. He also secretly favored the party of Don Carlos; but, on the other hand, by treating any unseasonable outbreak with a strictness bordering on cruelty, he preserved himself from the suspicion of being implicated in their schemes. In 1833, when Ferdinand was supposed to be on his death-bed, he was prevailed on by C. to reintroduce the Salic Law, by which Christina was excluded from the throne, and Don Carlos, the favorite of the Absolutists, appointed his successor. This excited the hatred of the nation; and Ferdinand recovering, abolished the law. To avoid imprisonment, C. fled to France. He died at Toulouse in 1842.

CA'LOMEL is the popular name given to one of the compounds of mercury (Hg) and chloride (Cl), and known to scientific chemists as the subchloride of mercury (Hg Cl). It is prepared by taking two equal portions of mercury, dissolving one portion in hot concentrated sulphuric acid (SO^3), which forms sulphate of mercury ($HgOSO^3$), thereafter adding the second part of the metal, and triturating the whole in a mortar till the metal becomes incorporated with the sulphate of mercury. This mixture is then added to one-half its weight of common salt (NaCl), and heated in a retort, when C. sublimes, and condenses in the cool part of the receiver, as a fine white powder. A minute portion of corrosive sublimate which accompanies it, is removed by washing with water. C. is very dense. It is not soluble in water, and sparingly so in acids. It turns black on the addition of lime-water, potash, soda, or ammonia; and when heated in an iron spoon, or on a knife, it does not char, but rises in vapor, sublimes unaltered, and readily condenses again on any cool surface held near it. Although C. has been more used in British practice than any other preparation of mercury, it is not known to have been employed before the 17th century. Its medicinal virtues will be treated of with the other mercurials. *See* MERCURY.

CALONNE, Charles Alexandre de, Controller General of Finance in France

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under Louis XVI., was born, January 20, 1734, at Douay. Possessing superior abilities, he studied law, and having filled successively various offices, was made, in 1783, Controller General of the Treasury. In this capacity he soon gained favor among the courtiers, who had complained of the parsimony of Turgot and Necker. C., though he found French finance in a deplorable state, was determined not to *seem* poor, gave brilliant entertainments, paid off the debts of his patron the Count of Artois, supplied the queen with sufficient pocket-money, granted pensions and gratuities to his supporters and favorites, paid off arrears, and purchased the residences of St Cloud and Rambouillet! His means of raising money were perfectly simple—he borrowed, anticipated, issued chancery-edicts, and prolonged and augmented extraordinary taxations in a style never known before. The parliament resisted these measures, but C., backed by royal authority, carried them into execution. The crisis necessarily arrived; and in 1786, when the people could bear the extraordinary taxation no longer, C. advised the king to convoke the Assembly of the Notables, and proposed to abolish the privileges (exemption from taxes) of the noble and wealthy, to take the duty off salt, to abolish *socage* (feudal or compulsory service to the lord of the manor), and to distribute the burden of taxation more equally. The people and the aristocracy demanded a convocation of the States General, instead of the Assembly of the Notables; but C. boldly proceeded with his plan, opened the Assembly of the Notables, February 2, 1787, and in a pleasant and florid oration, described the general prosperity of French industry and commerce, and brought his speech to a climax by confessing that the annual deficit of the treasury had risen to 115 millions of francs, and that during the time from 1777 to 1786, the government had borrowed no less a sum than about 1250 millions! The Notables, instead of proceeding with C.'s plan of reorganisation, demanded from him a statement of accounts. Not being able to give this satisfactorily, he was stripped of his dignities, and banished to Lorraine. After this, C. resided chiefly in England, until in 1802 he obtained from Bonaparte permission to return to France, where he died, in very embarrassed circumstances, October 30, 1802.

CALOPHY'LLUM (Gr. beautiful leaf), a genus of trees of the natural order *Guttiferæ* (q. v.), natives of warm climates. Some of the species yield valuable timber, as *C. angustifolium*, the PINEY TREE, which grows at Penang, and in the islands to the eastward of the Bay of Bengal, and furnishes the beautiful straight spars called *Peon*. The resinous products of some species are valuable, and among them are some of the substances known by the name of TACAMAHACA (q. v.). *C. Inophyllum*, which yields true East Indian Tacamahaca, is a very large and beautiful umbrageous tree, often planted for its shade and the fragrance of its flowers, which are white and in loose axillary racemes. It is one of the most valuable timber-trees of the South Sea islands. The timber resembles mahogany, being of equally close texture, although of lighter color, and very durable. The leaves are oblong and obtuse; the fruit—which in all this genus is a globose drupe or stone fruit—is about the size of a walnut; and a fixed oil is expressed from its kernel, which is used for lamps, &c. A similar oil is expressed from the seed of *C. Calaba*, the CALABA TREE of the West Indies, which also has white sweet-scented flowers, and of which the timber is used for various purposes, particularly for staves and cask-headings.

CALO'RIC, a term for Heat (q. v.).

CALORIC ENGINE. This was the name given by Captain Ericsson to his latest *air-engine*. There seems no reason for the change of name, unless it were meant to distinguish it from the previously well-known, though hitherto unsuccessful air-engines of the Messrs Stirling. We shall in this article treat air and caloric engine as synonymous terms.

It is a well known law, applicable to all thermodynamic engines, that (presupposing the merely mechanical part of the machine to be perfect) the heat converted into work bears the same proportion to the total heat given to the fluid that the range of temperature bears to the highest *absolute* temperature of the fluid. Thus supposing an engine to receive steam* at the temperature of 275° F., and discharge it at that

* The law is the same for steam, air, or *any other fluid whatever*.

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of 120° F., the fraction of heat which it can convert into work will be $\frac{275-120}{275+461}$ or about 21 per cent. of the total heat of the fluid. This proportion would be, of course, greatly reduced in practice, owing to imperfections in the machinery, but these being equally likely to occur in all prime movers, we need not consider them here. The *lowest* limit of temperature available being practically constant, fixed either by the temperature of the atmosphere, or that obtainable in a condenser; it follows that greater economy can only be looked for in the direction of increase of initial temperature. In ordinary steam-engines, in which the pressure and temperature increase simultaneously, the latter is limited by the former, which in its turn is kept, by considerations of safety, comparatively low. When, however, *superheated* steam (steam to which additional heat has been imparted without the corresponding addition of pressure) or heated air is used, the temperature is limited only by the power of the metals composing the machine to resist the destructive action of heat, or the chemical action of the fluid at that temperature. Heated air possesses the advantage over superheated steam as a motive power, that with it an explosion, in the usual sense of the word, is rendered almost impossible, and that, if one were to occur, it would be comparatively harmless. It also, of course, enables the boiler to be dispensed with.

Air-engines, in their principal working parts, are very similar to ordinary steam-engines. The heated air is introduced into a cylinder, in which works a tightly fitting piston, which is thus compelled to move up and down, and transfers its motion to a revolving shaft by means of a piston and connecting-rod in the usual manner. The motion of the piston results in all cases from the expansion of the heated air; the air is heated by means of a furnace, is introduced below the piston, raises it, and then is allowed to escape into the atmosphere. Air-engines are almost invariable single-acting; they are sometimes worked simply by heated air, and sometimes with the air which, having passed through the furnace, is mixed with all the gaseous products of combustion. The latter method has the immense advantage that it utilizes the heat which would otherwise be rejected into the chimney. The total efficiency of the machine is thus increased, although the efficiency of the engine proper, between the given pair of temperatures, remains the same.

The more heat carried away by the discharged air—the higher its temperature, in other words—the smaller evidently is, *cæteris paribus*, the range of temperature of the machine, and the less, therefore (as already explained), will be its efficiency. The distinctive principle of the Messrs Stirling's air-engine, as of the later C. E. consists in utilising a great part of this wasted heat, and thus economising fuel. This is effected by means of a "regenerator," or, more properly, "economiser," consisting of a chamber filled with metallic sieves of wire-gauze, through which the hot air is made to pass *outwards* from the cylinder, after having performed its work on the working-piston of the engine. As much of the heat of the escaping air is taken up by the regenerator, and its temperature thus reduced, the range of temperature of the machine is correspondingly increased. The fresh air entering the cylinder for the next stroke was compelled to pass *inwards* through the regenerator, and abstracted from it the heat left in it. In this way it did not require to receive so much heat in the furnace as would otherwise have been the case, and thus economised fuel.

This method of preventing waste of heat was first discovered by the Rev. Dr Stirling, who obtained a patent for it in 1816. In working with air at the ordinary pressure of the atmosphere, however, the engine was found to require to be of large dimensions as compared to a steam-engine of the same power; and in order to obviate this objection, compressed air was used, the idea originating with Mr James Stirling, C.E. Several other difficulties were successfully surmounted by the Messrs Stirling, and eventually two improved engines were constructed, one of which was tested to fully 40 horse-power. This latter engine did all the work of the Dundee Foundry Company regularly for upwards of three years, during which period they employed no other motor. At the end of this period it was laid aside, principally owing to the repeated failure of one of the heating vessels.

Captain Ericsson, in his attempt to introduce his C. E. in the ship which bore his name, experienced precisely the same difficulties and disappointments, and tried

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nearly the same remedies as the Messrs Stirling. There seems little doubt, however, that he actually believed his "regenerator" was to make the *same heat* do work over and over again—to be a kind of perpetual motion—and under these circumstances it is not to be wondered at that his machines (notwithstanding some not very creditable manœuvring on the part of their upholders) entirely failed, and that in two years (1855) they were replaced by steam-engines.

An excellent popular development of the theory of air-engines, by the late Professor Rankine, will be found in the "Edinburgh Philosophical Journal," January, 1855.

CALORI'METER, a measurer of the degree of heat (q. v.).

CALO'TROPIS. See MUDAR.

CALOTTISTES (*Le Régiment de la Calotte*), a society of witty and satirical men, in the time of Louis XIV., who were headed by two officers in the king's bodyguard, named Torsac and Almon. Their name was taken from the word *calotte* (a "small cap," worn by monks over the tonsure), and their amusement consisted in sending to any public character who had exposed himself to ridicule, a "patent," authorising him to wear the *calotte*, as a covering for the weak part of his head. The armorial bearings of the *Régiment de la Calotte* consisted of various symbols of folly, with the motto, "*C'est régner que de savoir rire.*" When Torsac, its first "generalissimo" died, the society—which occupied a position of satirical hostility to the French Academy—drew up a burlesque funeral oration, manufactured out of the pompously eulogistic phrases that the academicians were in the habit of using. As the society became audacious, and did not spare even royalty itself, it was dissolved by the minister Fleury. The "Mémoirs pour servir à l'Histoire de la Calotte" (Basel, 1725) is an amusing little book. During the Restoration, the title *Régime de la Calotte* was applied to the priestly administration of affairs.

CA'LOTYPE PRO'CESS (Gr. *kalos*, beautiful, *typos*, impression), a title comprehending a variety of methods for the production of negative photographs on paper; and so named by the inventor, the late Dr H. Fox Talbot, who exhibited the result of his experiments in the year 1840. The *principle* involved in the C. P. depends on the susceptibility to the action of daylight of a surface chemically prepared, and the *practice* consists in the preparation, and exposure in the camera, of a sheet of paper, having on one surface an even and finely divided layer of iodide of silver, nitrate of silver, and an organic acid; the image obtained on this surface being subsequently developed with gallo-nitrate of silver. It will be unnecessary here to describe the various modifications which have been introduced with the object of imparting a high degree of sensibility to the paper; one process—the best—will suffice to describe the manipulation.

Good English paper, sized with gelatine, should be chosen, the foreign starch-sized papers being unsuitable, on account of the solutions sinking in too deeply, and thus impairing that sharpness of outline which should be possessed by a good negative. The paper is then floated on one side, and for a moment only, on a solution of iodide of silver in iodide of potassium; prepared by adding freshly precipitated iodide of silver to a *strong* solution of iodide of potassium. It is then dried, and plunged into a dish containing distilled water, which, by removing the soluble iodide of potassium, precipitates the iodide of silver in an even and finely divided condition over the whole surface of the paper, which in this state will keep good for twelve months. It is now ready to receive the *sensitive coating*; this operation, which is called *exciting* the paper, is performed in the following manner: Two solutions are prepared—one, a saturated solution of gallic acid in cold distilled water, called solution A.; the other a solution of 50 grains of nitrate of silver in one ounce of distilled water, to which one dram of glacial acetic acid has been added; this is called solution B. The iodised paper obtained as above is now laid on a board having a piece of clean blotting-paper on it a little larger than the paper to be excited, and the following solution brushed over it with a clean Buckle's brush—distilled water, 1 oz.; solution A, 15 drops; solution B, 15 drops. This mixture, prepared in a chemically clean glass vessel, should be freely applied, and the excess absorbed by clean blotting-paper. The paper is now ready for exposure in the camera, and may be at once placed in the dark slide; or a stock may be thus sensi-

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tised, and preserved between folds of blotting-paper until required for use. The *time of exposure*—varying from three minutes to a quarter of an hour—is determined by the diameter and focal length of the lens employed, the aperture of the diaphragm or stop, and the amount of light prevailing at the time. The *development of the latent image*, an operation, which, like the preceding, is of course conducted in a room illuminated only by yellow light, is accomplished by applying freely and uniformly over the whole surface solution A; and when the image begins to appear, applying a second quantity, to which a few drops of solution B have been previously added, to increase the intensity. The whole operation of development occupies about a quarter of an hour; and when the details are fully out, the picture should be washed with water, and *fixed*, by immersion in a solution of 1 part of hypo-sulphite of soda to 4 parts of water; it is then again freely washed in frequent changes of water during several hours; it is lastly *dried* and *waxed;* when it may be regarded as a finished negative, from which positive prints may be obtained, having the lights and shadows as in nature. See POSITIVE PRINTING.

CALOY'ERS, a general name for the monks of the Greek Church. The name is a corruption of two Greek words, *kalos* and *geron*, and signifies "good old men." The C. follow the order of St Basil, and are divided into three ranks: the novices, called *Archari;* the ordinary professed, called *Microchemi;* and the more perfect, called *Megalochemi.* It is always from among them that bishops and patriarchs are chosen, because they are generally members of the most distinguished families of the upper and middle classes. The C. also furnish the only learned theologians in Greece at the present day. Their monasteries are very numerous. The most celebrated in Asia is that of Mount Sinai, founded by the Emperor Justinian, and endowed with a revenue of 60,000 crowns. In Europe, Mount Athos alone has twenty, the inmates of which have so great a reputation for sanctity, that even the Turks seek an interest in their prayers. The C. are obliged to labor for the benefit of their monastery as long as they continue in it. Their religious services occupy an unnaturally large portion of their time, beginning at midnight, and continuing at intervals until sunset. They observe four Lents: the first, of eight weeks, in commemoration of the resurrection of our Lord; the second, of three weeks, in honor of the holy apostles; the third, of fourteen days, in commemoration of the Assumption of the Virgin; and the fourth, in commemoration of the Advent.—There are also female C., or Greek nuns, who likewise follow the rule of St Basil.

CA'LPEE, a city of Jhansi, one of the n. w. Provinces of India, on the right bank of the Jumna, in lat. 26° 7′ n., and long. 79° 48′ e. Pop. (1872) 15,570. It is an entrepôt for the cotton of the neighboring district. It has manufactures of cotton and paper, and is celebrated for the beauty of its refined sugar. It became British by capture and cession, respectively, in 1803 and 1806. It is 51 m. s. w. of Cawnpore, and is closely linked with it in the history of the insurrection of 1857—1858, as the headquarters of the Gwalior Contingent.

CALPENTY'N, a long and narrow peninsula on the west side of Ceylon, in lat. 8° 14′ n., and long. 79° 53′ e. The neck is so low as to be overflowed during the north-east monsoon, so that it is transformed into an island.

CALPU'RNIUS. The Calpurnia gens was, by its own account, one of the oldest plebeian clans in Rome; but it does not figure in history till the time of the first Punic war. The family names, in the time of the Republic, were Bestia, Bibulus, Flamma, and Piso.—MARCUS CALPURNIUS BIBULUS is known as the hostile but incapable colleague of Cæsar (q. v.) in the consulate. He was put up by the aristocratic party, who spent vast sums to carry the election. He finally joined the Pompeian party, had command of the fleet intended to prevent Cæsar's passage to Greece, and died 48 B. C. before the battle of Dyrrhachium. Among the Roman women of this family, two are celebrated—CALPURNIA, the daughter of Calpurnius Piso (consul 58 B. C.), and the last wife of Cæsar, who seems, from the scanty notices of her we possess, to have been a quiet domestic woman, full of love and solicitude for her great husband; and CALPURNIA, the daughter of L. Calpurnius Bestia, wife of P. Antistius, who killed herself when her husband was murdered by order of the younger Marius, 82 B. C.

CALTABELLO'TA (a Saracenic name — "the Castle of the Cork-trees"), a town of Sicily, Girgenti, 7 miles north-east of Sciacca, most picturesquely situated around

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an ancient castle, which crowns a steep rock overhanging a stream (anc. *Crimisus*), of the same name as the town. Of its churches the *Chiesa Matrice* is a beautiful relic of the middle ages, resembling a mosque, with a single row of columns down the middle. C. was captured by the Saracens in 840 A. D. Pop. 6200.

CALTANISE'TTA, a fortified town of Sicily, situated on a fertile plain near the Salso, about 28 miles north-east of Girgenti. It has mineral springs and extensive sulphur-works. Pop. (1872) 26,156.

CALTAVUTU'RO, a town of Sicily, a province of Palermo, and 37 miles south-east of the city of that name, on a small river, the Grande. The town is of Sarracenic origin. Jasper is found near C. Pop. 5000.

CA'LTHA. See MARSH MARIGOLD.

CALTO'NICA, a town of Sicily, about 15 miles north-west of Girgenti. It has pretty extensive sulphur-works and salt-works. Pop. 7000.

CA'LTROP, Ca'lthrop, or Ca'lthorp, in military warfare, is a four-pronged piece of iron, each prong about four inches in length. When it is wished to check the approach of the enemy's cavalry over a plain, or of his besiegers in the ditch of a fortification, caltrops are sometimes thrown down; from their shape, one prong is sure to stand upright, and may work terrible mischief to the enemy's horses or men.

CALUIRE, a town of France, in the department of the Rhone, situated on the left bank of the Saone, about three miles north-north-east of Lyon. It has three annual fairs. Pop. (1872) 6773.

CALU'MBA, or Colo'mbo, very extensively used in medicine, is the root of *Cocculus palmatus*, a herbaceous plant of the natural order *Menispermaceæ* (q. v.). It is said to derive its name from Colombo in Ceylon, although the C. now chiefly in use is the produce of Mozambique. The flowers in this genus have 12 sepals and petals in all, similar in appearance, and disposed in four rows. The male and female flowers are on separate plants. *C. palmatus* has nearly circular leaves with 5—7 lobes, on long, hairy foot-stalks, and solitary axillary racemes of small green flowers, the racemes of the male plants branching. The fruit is a drupe, or 1-seeded berry-like fruit, about the size of a hazel-nut, densely clothed with long hairs. The stem is annual and twining; the root perennial, consisting of clustered spindle-shaped fleshy tubers, with a brown warty epidermis, and internally deep yellow. The plant is not cultivated; the root is collected where it grows wild in dense forests. It is dug up in March, cut into slices, or short cylindrical pieces, and dried in the shade. In this state it appears in commerce, having a greenish-yellow tint, a very bitter taste, and a faint aromatic odor. Its bitterness is ascribed to a somewhat narcotic principle called Calumbine, and to *Berberine*, an alkaloid originally discovered in the Barberry (q. v.), which is also present in it. C. is regarded as one of the most useful stomachics and tonics. It is demulcent, not at all stimulant, and capable of being employed in cases in which almost every other tonic would be rejected by the stomach. It is sometimes given to allay vomiting. It has been found very useful in diarrhœa and dysentery. It is administered in the form of powder, infusion, or tincture. Similar properties seem to reside in the roots of the species of *Cocculus* generally.—The very poisonous seed known by the name of COCCULUS INDICUS (q. v.) belongs to a plant of a different but allied genus.—The root of *Frasera Walteri* is sometimes fraudulently substituted for C., and has been called American Calumba Root. It does not agree with C. in its properties, but, besides its very different appearance, it may be distinguished by its undergoing no such change of color when touched with tincture of iodine, as in true C. Root is produced by the presence of starch. See FRASERA.

CA'LUMET, the "peace-pipe" of the North American Indians, is a tobacco-pipe having a stem of reed about two and a half feet long, decorated with locks of women's hair and feathers, and a large bowl of polished marble. It plays an important part in the conclusion of treaties, of which, indeed, it may be described as the ratifier. After a treaty has been signed, the Indians fill the C. with the best tobacco, and present it to the representatives of the party with whom they have been entering into alliance, themselves smoking out of it afterwards. The presentation of it to strangers is a mark of hospitality, and to refuse it would be considered an act of hostility.

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CAL'UMNY. An ancient regulation of the Scotch law obliged litigants to give their *oath of C.*—that is, they swore, either by themselves or by their counsel, that the facts alleged by them were true, although in practice this oath was not usually put unless one of the parties required it of his adversary. In the modern practice, however, of the Court of Session, this oath is confined to actions for divorce, and other consistorial cases—the object being to guard against collusion between the husband and wife. See DIVORCE.

CALUMNY, Law as to. See LIBEL.

CALU'SO, a town of n. Italy, in Piedmont, province of Turin, about 11 miles south of Ivrea, and connected with Turin by railway. Pop. 3500.

CALVADOS, a maritime department in the north-west of France, bounded n. by the English Channel, and e. w., and s. by the departments of Eure, Manche, and Orne. It is formed out of a part of the old province of Normandy. The principal rivers are the Touques, Orne, Dives, Seulle, Dromme, and Vire. The coast, which has few bays or inlets, is partly formed by bold ridges, and partly by sand-downs, cliffs, and reefs. The reef extending between the mouths of the Orne and the Vire, called Calvados, after one of the vessels in the Spanish Armada shipwrecked here, and from which the department takes its name, is very dangerous to navigation. The soil of the department is generally fertile, especially in the valleys, supplying rich pasturage for horned cattle, sheep, horses, and swine, which constitute the principal wealth of Calvados. The climate is healthy, though changeable. Iron, marble, slate, and coal are found. There are various manufactures, and the coast fisheries are of some importance. C. has an area of 2130 square miles, with a population in 1872 of 454,012, and is divided into six arrondissements. Caen is the capital.

CALVAERT, called also Dionisio Flammingo, a distinguished painter, especially in landscape, was born at Antwerp in 1555. He settled early at Bologna, where he opened a school, and had among his students the celebrated Domenichino, Guido, and Albani, who were afterwards, however, pupils of the Caracci. Many excellent pictures by him are still preserved at Bologna. He died in 1619.

CA'LVARY, Mount, the scene of our Saviour's crucifixion, is an eminence which lay at the north-west, and just on the outside, of the ancient city of Jerusalem. Calvary, or Calvaria, is a translation into Latin of the Hebrew word Golgotha, signifying a "skull," either because the mount was a place of public execution, or because it was shaped like a human skull.

CALVARY, in Roman Catholic countries, is a representation of the various scenes of the passion and crucifixion of our Lord, either in a chapel, or external to the church, as at St Jacques at Antwerp. It consists of three crosses with the figures of Christ and the thieves, usually as large as life, surrounded by a number of figures, representing the various personages who took part in the crucifixion. At Aix-la-Chapelle, the C. is a church on the top of a hill, surrounded by twelve sculptured stones, each marking an event which took place on the journey of the Saviour to Mount Calvary. The approach to the C. is called the *Via Dolorosa*, each of the stones marking what is called a station, at which the pious say a prayer in passing.

CALVE'LLO, a town in the province of Basilicata, Italy, pleasantly situated on a hill-slope about 13 miles south of Poteuza. It has two convents. Pop. 5650.

CALVENTU'RA ISLANDS, off the coast of Arracan, in the Bay of Bengal, their centre being in lat. 16° 58′ n., and long. 94° 20′ e. The group consists of two divisions—one to the south-east, which is composed of two lofty and well-wooded islets; and another to the north-west, which presents seven bare rocks, chiefly of fantastic shapes.

CA'LVI, a seaport on the island of Corsica, situated on a peninsula in the Gulf of Calvi, about 38 miles west-south-west of Bastia, lat. 42° 35′ n., long. 8° 43′ e. It is strongly fortified, and has a good port, with a high light at its entrance, and a considerable export trade. C. was captured by the English in 1794, after a siege of 51 days. Pop. (1872) 1969.

CA'LVILLE, a kind of apple, of which there are numerous sub-varieties. The calvilles diminish in thickness from the middle towards the calyx, where they form a

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point; they have regular ribs, and a large open seed-chamber; also a pleasant smell, and are unctuous to the touch. They are never altogether streaked; they have a fine loose flesh, with a flavor somewhat resembling that of the raspberry or strawberry. The White Winter C. is in high repute both as a culinary and dessert apple; it is very extensively cultivated on the continent of Europe.

CALVIN, John, one of the most eminent of the reformers of the 16th c., was born at Noyon, in Picardy, on the 10th of July 1509. His father, Gerard Cauvin or Calvin, was procureur-fiscal of the district of Noyon, and secretary of the diocese. He was one of six children—four sons and two daughters. All the three sons who survived were bred ecclesiastics; and the reformer himself, while still only 12 years of age, was appointed to a chaplaincy in the cathedral church of Noyon. This he held as a means of support during the period of his education, and even for some short time after he had entered on his reforming career. C. was educated in circumstances of ease, and even affluence. The noble family of Mommor, in the neighborhood, invited him to share in the studies of their children; he was in some measure adopted by them; and when the family went to Paris, in his 14th year, he accompanied them, and participated in the benefits of the higher instruction which was there attainable. He was entered as a pupil in the Collége de la Marche, under the regency of Mathurin Cordier, better remembered, perhaps, by his Latin name of Corderius. It was under this distinguished master that C. laid the foundation of his own wonderful mastery of the Latin language. During this early period, he was distinguished by the great activity of his mental powers, and the grave severity of his manners. His companions, it is said, surnamed him the "Accusative."

For awhile, his attention was directed to the study of law. His remarkable talents seemed to promise great success in this branch of study, and his father sent him, with the view of prosecuting it, to the university of Orleans, then adorned by Pierre de l'Etoile, one of the most famous jurists of his day, and afterwards president of the Parliament of Paris. At Orleans, he continued the same life of rigorous temperance and earnest studiousness for which he was already noted. Beza says, that, after supping moderately, he would spend half the night in study, and devote the morning to meditation on what he had acquired. His undue habits of study seem to have laid thus early the foundation of the ill-health which marked his later years. It was while a law-student in Orleans that he became acquainted with the Scriptures, and received his first impulse to the theological studies which have made his name so distinguished. A relative of his own, Pierre Robert Olivetan, was there engaged in a translation of the Scriptures; and this had the effect of drawing C.'s attention, and awakening within him the religious instinct which was soon to prove the master-principle of his life. We cannot say as yet that his traditionary opinions were unfixed, or that he had embraced with any decision the Protestant opinions that were spreading everywhere; but the seeds of the new faith were now beyond doubt sown in his heart, and from this time, although he still continued for awhile longer to pursue his legal studies, his main interests appear to have been religious and theological. From Orleans he went to Bourges, where he acquired the knowledge of Greek, under the tuition of a learned German, Melchior Wolmar, to the influence of whose spiritual instructions he was also greatly indebted. He began here to preach the reformed doctrines, and passed over into the ranks of Protestantism, under the slow but sure growth of his new convictions, rather than under the agitation of any violent feeling. Here, as everywhere, his life presents a marked contrast to that of Luther.

He proceeded to Paris in 1533, which at this date had become a centre of the "new learning," under the teaching of Lefevre and Farel, and the influence of the queen of Navarre, sister of Francis I. The Sorbonne itself had not escaped the infection. There was a growing religious excitement in the university, in the court, and even among the bishops. This, however, was not to last. The king was soon stirred up to take active measures to quell this rising spirit; and the result was that C. and others were obliged to flee for their lives. The story is that C. narrowly escaped, having descended from his window by means of his sheets, and fled, under the guise of a vine-dresser, a friend of his, in whose clothes he concealed himself. After this he repaired for a short time to his native place, resigned the preferment he held in the Roman Catholic church, and for a year or two led a wandering life, sheltered in various places. We find him at Saintonge; at Nerac, the residence of

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the queen of Navarre; at Angoulême, with his friend Louis Tillet; then for a brief while at Paris again, strangely enough expecting a meeting with Servetus, who had expressed a desire to see and confer with him. Persecution against the Protestants at this time raged so hotly, that C. was no longer safe in France; and he betook himself to Basel, where he is supposed to have prepared the first edition of the "Institutes of the Christian Religion," and whence he certainly issued, in the year 1535, the famous preface addressed to Francis I. The concentrated vigor of this address, its intensity of feeling, rising into indignant remonstrance, and at times a pathetic and powerful eloquence, make it one of the most memorable documents in connection with the Reformation. It is throughout a noble defence of the righteous character of the reformed doctrines, and their support alike in Scripture and in history. The energetic decisiveness and moral zeal of the future teacher and legislator of Geneva, speak in every page of it. After completing this great service to the cause of Protestantism, he made a short visit to Italy, to Renée, the Duchess of Ferrara. Finally, he revisited his native town; sold the paternal estate, which had devolved to him on the death of his eldest brother; and bidding it adieu, set out in company with his younger brother and sister on his way to Strasburg. The direct road being rendered dangerous by the armies of Charles V., which had penetrated into France, he sought a circuitous route through Savoy and Geneva.

The result of this journey was memorable for the cause of the Reformation. Arrived in Geneva, he met there his friend, Louis Tillet, who communicated the fact of his arrival to Farel, then in the very midst of his struggle to promote the Reformation in the city and neighborhood. Farel hastened to see him, and urge upon him the duty of remaining where he was, and undertaking his share of the work of God, under the burden of which he was like to fail. C. did not at first respond to the call. He was given, he himself says, to his "own intense thoughts and private studies." He wished to devote himself to the service of the reformed churches generally, rather than to the care of any particular church. A life of intellectual and theological labor was that which at that time was most congenial to him. By some strange insight, however, Farel penetrated to the higher fitness of the young stranger who stood before him, and he ventured, in the spirit of that daring enthusiasm which characterised him, to lay the curse of God upon him and his studies if he refused his aid to the church of Geneva in her time of need. This seemed to C. a divine menace. "It was," he said, "as if God had seized me by his awful hand of heaven." He abandoned his intention of pursuing his journey, and joined eagerly with Farel in the work of reformation.

Such was the beginning of C.'s great career in Geneva. Having entered upon his task, he soon infused an energy into it which crowned the struggling efforts of Farel with success. The hierarchical authority was already overturned before his arrival; the citizens had asserted their independence against the Duke of Savoy, whose alliance with the corrupt episcopate, which was the direct governing influence in the place, had called forth the patriotic as well as the religious feelings of the people. The magistrates and people eagerly joined with the reformers in the first heat of their freedom and zeal. A Protestant Confession of Faith was drawn out, approved of by the Council of Two Hundred, the largest governing board of the city, and then proclaimed in the cathedral church of St Peter's as binding upon the whole body of the citizens. Great and marvellous changes were wrought in a short time upon the manners of the people; where licence and frivolity had reigned, a strict moral severity began to characterise the whole aspect of society. The strain, however, was too sudden and too extreme. A spirit of rebellion to the rule of C. and Farel broke forth; they refused to yield to the wishes of a party animated by a more easy and liberal spirit than themselves, and known in the history of Geneva under the nickname of Libertines; and the consequence was, that they were both expelled from the city after less than two years' residence.

C. retreated to Strasburg, where he had meant to go when arrested in his course at Geneva. Here he settled, and devoted himself to theological study, and especially to his critical labors on the New Testament. Here, also, in October 1539, he married the widow of a converted Anabaptist. The marriage appears to have proved a happy one, although not of long duration.

The Genevans found, after a short time, that they could not well get on without Calvin. His rule might be rigid; but an authority, even such as his, which might

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galt from its severity, was better than no settled authority at all; and the Libertine party seem to have been unable to construct any efficient and beneficent form of government. Accordingly, they invited C. to return; and after some delay on his part, in order to test the spirit in which they were acting, he acceded to their invitation, and in the autumn of 1541, after three years' absence, once more made his entry into Geneva.

Now, at length, he succeeded in establishing his plan of church-government, in all its forms and details. By his College of Pastors and Doctors, and his Consistorial Court of Discipline, he founded a theocracy, with himself at the head of it, which aimed virtually to direct all the affairs of the city, and to control and modify both the social and individual life of the citizens. Not without a struggle, it may be supposed, did he succeed in his great autocratic scheme. The Libertines, although dishonored by their ineffectual attempts to maintain order in the city, and uphold its rights and dignity, still remained a strong party, which was even augmented, after C.'s return, by men such as Amy Perrin, who had strongly concurred in the invitation to C., but who were afterwards alienated from him by the high and arbitrary hand with which he pursued his designs, as well as by their own schemes of ambition. The struggle with this party lasted with various fortune for no less a period than fifteen years, and was only terminated in 1555, after a somewhat ridiculous *émeute* in the streets. Amy Perrin and others, driven from the city, were executed in effigy; and the reformer's authority from this date confirmed into an absolute supremacy.

During the period of this long struggle with the Libertines, C. had many other disputes, in which he conducted himself with no less heartiness and zeal. The most remarkable of these were his controversies with Sebastian Castellio, Jerome Bolsec, and above all, Michael Servetus.

C. had become acquainted with Castillio at Strasburgh. They entertained at first a warm friendship for each other, and C. shewed great zeal in assisting Castellio, whose poverty and learning had attracted his sympathy. When he returned to Geneva, he invited Castellio to join him there, and procured for him the title of Regent or Tutor in the gymnasium of the city. There was little similarity, however, in the characters of the two men, and the diversity of their tastes and views soon became apparent. The learning of Castellio was intensely humanitic; a classical spirit and a somewhat arbitrary opinionativeness moulded all his studies; and as soon as he began to apply himself to theology, he came into conflict with Calvin. In a letter to Farel in 1542, we find C. speaking of the freaks of "our friend Sebastian, which may both raise your bile and your laughter at the same time." These freaks relate to Castellio's notions of Scriptural translation, and his refusal of C.'s offer to revise the version which he had made of certain parts of Scripture. Then, two years later, when Castellio desired to enter into the ministry, C. dissuaded the council from accepting him, on account of some peculiar opinions which he held; these were certain rationalistic views as to the authenticity and character of the Song of Solomon, the descent of Christ into hell, and also about election. After this, Castellio left Geneva for awhile, but soon returning, he attacked the views of C. openly. After a violent scene in church, which is painted in C.'s letters very strongly, he was forced to leave the city. The two old friends, now declared enemies, did not spare each other henceforth. The fate of Servetus drew forth an anonymous publication, attacking with keen logic and covert and ingenious sarcasm the Genevan doctrines. This publication was attributed by both C. and Beza to Castellio, and they replied to him in no measured terms, stigmatising him as a "deceiver and vessel of Satan." One fact really disgraceful to C. in the controversy deserves not to be passed over. Sunk in great poverty, Castellio was obliged, in his old age, to gather sticks on the banks of the Rhine at Basel, as a means of support. C. did not hesitate to accuse him of stealing the sticks. Such polemical truculence may well make us turn away in disgust and indignation.

The controversy with Bolsec belongs to a later period. Jerome Bolsec was originally a Carmelite monk, but he had thrown aside the habit, and betaken himself to the practice of medicine in Geneva. He was led to attack C.'s doctrine of predestination. As soon as C. heard of this, he led him to understand that he was not at liberty to question the Genevan doctrine. He and the other clergy dealt with him;

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but after repeated disputations Bolsec was found incorrigible, and was sentenced to banishment from the city. Cast out of the theocratic community, he ultimately rejoined the Roman Catholic Church, and revenged himself in a somewhat mean way against C. by writing his life in a spirit of detraction and slander.

Of all these contests, however, the most memorable is that with Servetus. A melancholy interest encircles the name of this great heretic, which the criminal tragedy of his death keeps always fresh and vivid in the minds of all who hate intolerance, and who love truth rather than dogmatism. The character of Servetus himself has little to do with this interest. He seems to have been more of a vain, restless, and enthusiastic dreamer, than of a calm and patient inquirer. In his very dreams, however, and the vague audacities of his speculation, there is a kind of simplicity and unconscious earnestness that wins sympathy. He had entered into various connections with C., even from the time of his early residence in Paris; particularly, he had sent him various documents containing the views, fully developed in his work subsequently published under the title of "Restitutio Christianismi." C. never concealed his abhorrence of these views; and in a letter to Farel as early as 1546, he threatens that if Servetus should come to Geneva, he would do what he could to bring him to condign punishment: *Nam si venerit modo valeat mea authoritas, vivum exire nunquam patiar.* The history of his seizure and condemnation at Vienne by the Catholic authorities, and especially of C.'s share in the correspondence which led to his seizure, is very complicated and obscure. It has been maintained that C. was the instigator, through a creature of his own of the name of Trie, of the whole transaction; it *is certain* that he forwarded to the authorities, through Trie, private documents which Servetus had intrusted to him, with a view to the heretic's identification, and as materials for his condemnation. Servetus was sentenced to be burned, but effected his escape, and, after several months' wandering, he was found at Geneva. It was his intention to proceed to Italy, where he hoped his opinions might meet with some degree of toleration, and he arrived at Geneva on his way. This is the explanation of an event otherwise unaccountable. Having ventured to church, according to the common account, he was recognized, apprehended, and conveyed to prison by C.'s order, just as he was about to leave the city. The particulars of his trial are full of interest, but too lengthened to be detailed here. It lasted, with various interruptions, for two months. He attacked C. with the most foul epithets, and C. retorted with a virulence and foulness quite equal to his own. At length, on the 26th of October 1553, sentence was passed upon Servetus, condemning him to death by fire. C. used his influence to have the mode of death alleviated, but without success. On the very next morning, the sentence was put into execution. On an extended eminence at some distance from the city, Servetus was fastened to a stake surrounded by heaps of oak-wood and leaves, with his condemned book and the MS. he had sent to B. attached to his girdle; and, amid his agonising cries, the fire was kindled, and the wretched man expiated his heresy amidst the flames. Whatever apologies may be urged for this memorable crime, it must remain a mournful and scandalous blot on the history of the Reformation. The disgrace of it has particularly attached to C., and with some justice, from the special and unhappy relation which he bore to the whole transaction; but most of the Reformers are no less implicated in it. The wise Bullinger defended it, and even the gentle Melanchthon could only see cause for gratitude in the hideous tragedy.

After the execution of Servetus, and the expulsion of the Libertines, two years later, C.'s power in Geneva was firmly established, and he used it vigorously and beneficently for the defence of Protestantism throughout Europe. By the mediation of Beza, he made his influence felt in France in the great struggle that was there going on between the hierarchical party, with the Guises at its head, and the Protestants, led by Condé and Coligny. In 1561, his energies began to fail. He had been long suffering from bad health, but his strength of will and buoyancy of intellect sustained him amid all his bodily weakness. In the year now mentioned, his bad health greatly increased, and although he survived for more than two years, he never regained any vigor. He died on the 27th of May 1564.

Very different estimates, it may be imagined, have been formed of C.'s character, according to the point of view from which it is contemplated. None, however, can dispute his intellectual greatness, or the powerful services which he rendered to

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the cause of Protestantism. Stern in spirit, and unyielding in will, he is never selfish or petty in his motives. Nowhere amiable, he is everywhere strong. Arbitrary and cruel when it suits him, he is yet heroic in his aims, and beneficent in the scope of his ambition. Earnest from the first, looking upon life as a serious reality, his moral purpose is always clear and definite—to live a life of duty, to shape circumstances to such divine ends as he apprehended, and, in whatever sphere he might be placed, to work out the glory of God.

He rendered a double service to Protestantism, which, apart from anything else, would have made his name illustrious; he *systematised its doctrine*, and he *organised its ecclesiastical discipline*. He was at once the great theologian of the Reformation, and the founder of a new church polity, which did more than all other influences together to consolidate the scattered forces of the Reformation, and give them an enduring strength. As a religious teacher, as a social legislator, and as a writer, especially of the French language, then in process of formation, his fame is second to none in his age, and must always conspicuously adorn the history of civilization. Among C.'s most important works are: "Christianæ Religionis Institutio" (Basel, 1536); "De Necessitate Reformandæ Ecclesiæ" (1544); "Commentaires sur la Concordance ou Harmonie des Evangélistes" (Gen. 1561); "In Novum Testamentum Commentarii;" "In Libros Psalmorum Commentarii;" "In Librum Geneseos Commentarii." The first edition of C.'s whole works is that of Amsterdam, 1671, in 9 vols. fol. A complete critical edition by Baum, Cunitz, and Reuss began to appear at Brunswick in 1869. By the "Calvin Translation Society," in Edinburgh, his works have been collected, translated into English, and issued in 51 vols. 8vo, 1843—1855. Besides the original "Vita" by Beza, there are lives of C. by Bolsec (from the Catholic standpoint, 1577; new ed. 1875), Audin (1840), Bungener, Vignet and Tissot, (1864); and in Germany by Henry (1844), Stähelin (1863), and Kampschulte (vol. I. 1869).

CA'LVINISM is the system of religious doctrine associated with the name of Calvin, and supposed to distinguish the churches more particularly called the Reformed, in contradistinction to the Lutheran and Anglican churches. Calvin's doctrinal views are laid down at length in his "Institutio Christianæ Religionis," first published in 1536. It was not till many years later, however, that the name of C. came to be attached to a certain set of doctrinal opinions, and not till the rise of Arminius (q. v.) and the synod of Dort (q. v.) in 1618, that these opinions may be said to have been polemically marked off from others with which they are generally contrasted, and to which they are recognised as standing in opposition.

The difference of thought expressed in the Arminian and Calvinistic systems is as old as the history of Christian doctrine. In almost every point, Augustine may be said to have anticipated Calvin; while Pelagius and the eastern divines, such as Chrysostom, represented a type of opinion upon the whole consonant to that which in more modern times has been opposed to Calvinism. In the Roman Catholic Church, since the Reformation, the same opposition of thought has presented itself in the famous contest of Jansenism and Jesuitism.

The main point of distinction in the two systems or modes of Christian opinion, is as to the operation of divine grace in the salvation of sinners. In the one system, this operation is considered as predetermined and absolute; in the other, as merely prescient, and in some sense conditioned. *Predestination* and *Irresistible Grace* are the great key-notes of C.—its two main points. Others were added in opposition to Arminianism—viz., *Original Sin*, *Particular Redemption*, and the *Perseverance of the Saints;* but the first of these is not peculiarly Calvinistic, and the last two are merely corollaries from the doctrines of Predestination and Grace. Predestination is, in fact, the one distinguishing doctrine of the system, as it was of Augustinianism, of which C. was merely the revival. The divine will, apprehended as decretive and predestinating, is necessarily *irresistible* in its efficacy, *select* in its objects, and *persevering* in its results. The characteristic of C., therefore, is that it is a speculative Christian system, springing from a single great principle, carried out rigorously into all its logical consequences.

The Church of England in its earlier history, was Calvinistic in its creed, although mediæval and Catholic in its ritual. Puritanism was nothing else than a movement to reduce it altogether to a Calvinistic model. In the re-action which followed this movement, the Church of England, while retaining its original articles, nearly parted

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with its Calvinistic faith; and throughout the 18th c., its chief divines are conspicuously Arminian or latitudinarian. But with the revival of the evangelical party in the end of the century, C. revived; and it still maintains, if not an absolute sway, yet a powerful influence over many minds in the Anglican establishment, while it is the professed creed of a great proportion of the dissenters.

The Church of Scotland, along with the other Presbyterian churches in this country, and the large and numerously increasing bodies of Presbyterians in America, all hold to the Westminster Confession of Faith, the most elaborate and formal expression of Calvinistic doctrine that exists. But while holding to the same Calvinistic standard, these churches shew many varieties of actual opinion; and in the history of Presbyterianism, C. has shewn a tendency in its logical development to pass into Rationalism or Unitarianism. This is conspicuously the case in the church of Geneva itself, and some of the old Puritan churches of America. It still remains, however, as opposed to Arminian, Socinian, or any cognate forms of the same type of doctrine, the most living and powerful among the creeds of the Reformation.

CA'LW, or Kalw, an important manufacturing town in Würtemberg, chief seat of the Würtemberg timber-trade with Holland, and capital of a bailiwick of the same name, in the circle of the Black Forest, lies in the valley of the Nagold, on both sides of the stream, over which are two stone bridges. Cotton and woollen spinning, dyeing turkey-red, manufacturing woollen and cotton fabrics, making leather, stout shoes, cigars, &c., are the principal industries. Though the streets in the old town are irregularly built, there are many large and beautiful houses. Pop. (1871) 5582; (1875) 4642, nearly all Protestants.

CALX is the Latin term for quicklime. As quicklime is produced by burning limestone, the alchemists applied the term C. to the product obtained by burning any ore or other mineral substance; and *calcination* (q. v.) to the process.

CALYCA'NTHUS (Gr. calyx-flower), a genus of plants of the natural order *Calycanthaceæ*, an order allied to *Rosaceæ*, and of which only a few species are known, natives of North America and Japan—shrubs, with square stems, which are of remarkable structure, having around the central woody axis four smaller or imperfect ones. An aromatic fragrance characterises this order. In the genus C., the bark and leaves possess it as well as the flowers. The bark of *C. floridus*, a native of Carolina, has been used as a spice and carminative, and has acquired the name of Carolina Allspice, or American Allspice. The flowers are of a chocolate color.

CALYDO'NIAN BOAR. Once upon a time, according to a Greek myth, a certain Œneus, king of Calydon, the ancient capital of Ætolia, omitted a sacrifice to Diana, whereupon the goddess, in her rage, sent into his fields a frightful boar, which committed great devastation. No one had the courage to hunt it except Meleager, the son of Œneus, who, calling to his help the bravest heroes of Greece—Theseus, Jason, Nestor, and others—pursued and slew the monster. Later writers, however, affirm that he found it impossible to destroy the animal, until Atalanta, his mistress, aided him by piercing it with an arrow.

CALY'MENE, a genus of the fossil order Trilobites (q. v.). It differed from the other genera of the order in the individuals having the power of rolling themselves into a ball, so that they are often found coiled up like an oniscus, i. e., hog-louse—*vulgo*, a slater. The genus is characteristic of the Silurian formation. It is remarkable as a very long-subsisting species, passing from the Caradoc beds to the Ludlow rocks. Twenty species have been described.

CALY'PSO, in Grecian legend, was, according to Homer, the daughter of Atlas, and inhabited the solitary wooded isle of Ogygia, far apart from all gods and men. Ulysses being thrown upon her island by shipwreck, she treated him kindly, and promised him immortality if he would marry her. He was fascinated by her charms, but unwilling to desert his wife and his native land; she detained him, however, seven years, and bore him two sons. On his departure, she died of grief.

CALYPTRÆ'A (Gr. *kalyptra*, a head-dress), a genus of gasteropodous mollusks, of the order *Pectinibranchiata*, the type of the family *Calyptræidæ*, formerly included, in the genus *Patella*, or Limpet, when the mere form of the shell was more

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regarded in classification than the structure of the animal, and still known as Chambered Limpets, Cup-and-Saucer Limpets, Bonnet Limpets, and Slipper Limpets. The shell is limpet-shaped, but the apex is more or less spiral, and has a calcareous process from its inner surface for the attachment of a principal muscle. The *Calyptræidæ* differ much in shape, some being very flat, and others very conical; some elongated and slipper-like. The species are generally the natives of the shores of warm climates. Only two are British.—*Calyptræidæ* are common in the older fossiliferous rocks.

CA'LYX (a term originally Greek), in Botany, the outermost of the circles of modified leaves which surround the parts of fructification, and along with them constitute the flower. Within the C. there is generally at least a second circle of leaves, called the corolla (see COROLLA and FLOWER); but this is sometimes awanting, and the C. is the only envelope of the parts of fructification. The leaves of which the C. is composed are called *sepals*, when quite separate from each other; but they often grow together into a tube at the base, and the C. is then said to be *monosepalous* or *gamosepalous* (*monos*, one; *gamos*, union). The sepals are generally simple and without stalks; they are generally green, and differ much less widely from ordinary leaves than the petals or leaves of the corolla; sometimes, however, they are *petaloid*, and richly colored, as in *Fuchsia*. The C. and corolla of many endogenous plants resemble one another almost completely, and the common term *perianth* (q. v.) is then very generally employed. In some plants, the C. passes insensibly into the corolla, and it is not easy to distinguish the innermost sepals from the outermost petals. The C. is in such cases often composed of more circles of leaves than one. The C. occasionally falls off when flowering is over (*deciduous*), as in *Ranunculus*; sometimes even when it commences (*caducous*), as in the poppy; generally it remains till the fruit is ripe (*persistent*), and is then much enlarged and more brightly colored, as in *Physalis*. It often becomes fleshy, and forms the seeming fruit, as in the rose.—The glumes (q. v.) of grasses, &c., used to be regarded as a C., to which, however, they have no proper analogy.

CAM, or Granta, a river of England, which, rising in Essex, flows north-east through Cambridgeshire, and after a course of about 40 miles, joins the Ouse 3¼ miles above Ely. It gives its name to the town of Cambridge, which stands upon it, and below which it is navigable, and is classic on account of the boat-races on it by Cambridge students.

CAMA'LDOLITES, a religious order founded in the vale of Camaldoli, near Arezzo, in the Apennines, in 1018, by St Romuald, a Benedictine monk, and a member of the noble family of the Dukes of Ravenna. From Italy it spread into France, Germany, and Poland. The brethren, who wear a white garment, are, and have always been, characterized for the excessive rigidity of their monastic rule; but except to shew to what lengths in a cruel mortification of natural life man can proceed, they have been practically useless in the world. The order is now almost extinct.

CAMARGUE. See BOUCHES DU RHONE.

CAMARI'LLA, a Spanish word, diminutive of *camara*, literally signifies a little chamber. As *camara* is used to designate, *par excellence*, the chamber of the king of Spain, the royal chamber, so C. is also used to designate his private chamber or cabinet, the place where he receives his most intimate friends, courtiers, sycophants, and all the moral refuse that naturally gathers round a weak throne. Hence, in the political language of modern Europe, it has come to signify the influence exercised on the state by secret and unaccredited councillors, in opposition to the opinions of the legitimate ministry, an influence which in Spain particularly is most pernicious. The word first obtained this meaning in the time of Ferdinand VII., who was excessively addicted to the unkingly habit of listening to the insinuations of the companions of his pleasures.

CAMAY'EU and Mo'nochrome are terms by which painting in one color is designated. The ancients painted thus both in gray (*en grisaille*) and in red. Pictures of several tints, but where the natural colors of the objects are not copied, are said to be *en camayeu*. As one color generally prevails, we speak of blue, red, yellow, green camayeu. Polidori Caravaggio, for example, so overlaid his other colors

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with brown, that his works give the impression of monochrome paintings. Drawings in Indian ink, red and black chalk, pencil, &c., as well as engravings, may be said to be *en camayeu*.

CAMBACÉRÈS, Jean Jacques Régis, Duke of Parma, and High Chancellor of the French Empire, under Napoleon, was born at Montpelier, October 18, 1753. In 1791, he was appointed president of the criminal court in his native place. Afterwards, as member of the National Convention, he took a prominent part in sketching the new code of laws, and distinguished himself by his moderation. He denied the right of the Convention to condemn the king, and, when this was done, argued in favor of a reprieve. After the revolution of the 9th Thermidor (July 27, 1794), C. was elected president of the Convention, and, as head of the Committee of Public Safety, was active in procuring peace with Prussia and Spain. His enemies having succeeded in expelling him from office, he engaged himself in legal studies, and laid before the council of Five Hundred the sketch of a civil code which afterwards formed the basis of the "Code Napoleon." In 1796, C. was for a short time made president of this council. After the changes made in the Directory, he was made Minister of Justice, assisted in the revolution of the 18th Brumaire (November 9, 1799), was made Second Consul and faithfully attached himself to the interest of Napoleon, by whom he was raised to the office of High Chancellor of the Empire, and in 1808 was made Duke of Parma. He endeavored to dissuade Napoleon from the projected invasion of Russia, but in this instance his advice was vainly given. In 1813, when Napoleon took the field against the allies, C. was left as president of the regency, and in this capacity accompanied the empress to Blois. 1814. From this place he sent to Paris his vote for the abdication of Napoleon. During the Hundred Days, against his own will, he was made Minister of Justice, and President of the Chamber of Peers. After the second restoration, C. lived privately in Paris for some time; but in 1816, was exiled for having taken part in the execution of Louis XVI. In 1818, the civil and political rights were restored, and he returned to Paris, where he lived retired to the time of his death, March 5, 1824. Among the men of the Revolution, C. was one of the few whose activity was peaceable and truly progressive. His services in the establishment of law were great. His nature was mild and candid, and his intellect very acute.

CAMBAY', a city, district, and gulf of the north-west extremity of the peninsula of Hindustan.—1. C., the city, stands at the head of its gulf, and on the right bank of the Myhee, in lat. 22° 18' n., and long. 72° 39' e., being 76 miles to the north-north-west of Surat.—It contains about 33,700 inhabitants, having been at one time much more populous—ruinous palaces, mosques, and tombs, and an excavated temple of considerable pretensions, attest its former magnificence and extent. The main cause of its decay has been the gradual obstruction of its seaward navigation. It still exports grain, cotton, and ivory, besides its renowned manufactures in bloodstones and carnelian.—2. C., the district, contains an area of 350 square miles, stretching in n. lat. from 22° 9' to 22° 41', and in e. long. from 72° 20' to 73° 5'. It is attached to the presidency of Bombay, though under the government of a nawab of its own. Pop. 85,000.—3. C., the gulf, extends in n. lat. between 21° and 22° 10', and e. long. between 71° 50' and 72° 40', measuring 80 miles in length, and averaging 25 in breadth. In proportion to its size, it receives a vast quantity of fresh water—on the west, the Gooma, Oolowtee, Gelya, and Setroonjee; on the north, the Saburmuttee and Myhee; and on the east, the Nerbudda and the Taptee. The inundations of so many rivers, and the ebb and flow of tides, which fall and rise 30 feet, conspire not only to elevate the bottom, but also to generate movable quicksands.

CA'MBER, in Ship-building, implies a slight arching or convexity upwards. A "cambered" ship is one in which the floor is higher in midships than at the stem and stern.—The name "camber" is also given to a small dock in a dockyard, for containing boats, and for loading and unloading timber.

CAM'BERWELL, once a rural village, now a suburb of London, on the south side of the Thames.

CAMBERWELL BEAUTY (*Vanessa Antiopa*) one of the largest and most beautiful British butterflies, rare in Britain, although it has been found in many parts of

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the country. but common in the central and southern parts of Europe. The wings are of a deep brown color, with a band of black around the brown, and an outer band or margin of pale yellow, the black band containing a row of large blue spots, the yellow margin dappled with black specks, all the colors rich and velvety. The margin of the wings exhibits tooth-like angularities. The antennæ are terminated by a knob. The caterpillar feeds on the willow. It is black, with white dots and a row of large red spots down the back, and is rough with soft spines.—When Camberwell was more rural than now, and abounded in willows, this butterfly was sometimes taken there.

CA'MBIO, Ca'mbist. The former of these two words is the Italian for *exchange;* the latter for a *money-changer*. Cambist is also used figuratively as the title of a book in which the moneys, weights, measures, &c., of various nations are given in the equivalents of some particular one. For instance, Keley's "Universal Cambist," gives these in English, and the "Cambista Maltesa" in Italian.

CA'MBIUM (Lat. *cambio*, to change), in Botany, a layer of mucilaginous viscid matter, particularly abundant in spring, interposed between the woody layers and the bark of trees and other stems. Delicate cells (*Cambium cells*) are formed in it, which certainly fulfil important functions in the formation of new wood, although, notwithstanding much investigation by some of the greatest vegetable physiologists of our time, the nature of these functions is still very imperfectly ascertained. The medullary rays are connected with the C. cells, and these cells gradually elongate into the shape which belongs to those of woody tissue. The C. layer is found only in exogenous stems.

CAMBO'DIA, or Cambo'ja (native name, *Kan-pou-chi*), an extensive country of the Indo-Chinese Peninsula, now a protectorate of France, bounded on the s. w. by the Gulf of Siam, on the s. e. by French Cochin-China, and on the n. by Siam. Area, about 33,000 sq. m.; pop. about 900,000. The surface is mostly flat, and the soil fertile. There are extensive forests, which shelter elephants and deer; there are also wild-cattle and ponies, and the rhinoceros abounds. Among the chief products are rice, betel, areca-nuts, gamboge, spices, sandal-wood, and ivory. Iron occurs. See COCHIN-CHINA.

CAMBO'GE. See GAMBOGE.

CA'MBORNE, a town of Cornwall, 11 m. n. w. of Falmouth. It is surrounded by very productive copper, tin, and lead mines. C. church has a stone inscription of the tenth century. Pop. (1871) 7757.

CAMBRAI, a city of France, in the department of the Nord, about 32 miles south-south-east of Lille. It is situated on the right bank of the Scheldt, is strongly fortified and well built, with tolerably wide, but irregular streets, and many picturesque old houses. The cathedral, archepiscopal palace, town-house, and theatre are among the principal public buildings. The city was greatly injured in 1793, when the revolutionists, among other vandalisms, razed the fine cathedral. They also disentombed the remains of Fénélon, who was archbishop here, and melted his lead coffin into bullets. A monument, however, by David the sculptor was erected (1825) in the new cathedral, in memory of the immortal author of "Télémaque." The manufactures of the city are important, consisting of cambric—so called from its manufacture here—linen-thread, lace, cotton-yarn, beet-root sugar, soap, starch, leather, &c. It has also a trade in agricultural produce. The population, in 1876, was 16,966.

C. was known to the Romans under the name of *Camaracum*, and it was then one of the chief cities of the Nervii. It was fortified by Charlemagne, and was long governed by its own bishops, to whom Charles the Bald ceded it. The celebrated league against the republic of Venice, which comprised the pope, the emperor of Germany, and the kings of France and Spain, was entered into here in 1508, and takes its name from the city. Here also were concluded treaties between the French king and the German emperor in 1529, and in 1724—1725 between Charles VI. and Philip V. of Spain. During 1815—1818 it was the head-quarters of the British army of occupation.

CA'MBRIA, the ancient name of Wales, the Britannia Secunda of the Romans.

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Cambrian
Cambridge

The name is derived from that of Cimbri or Cymri, by which the Welsh have always called themselves. See BRETS AND SCOTS.

CAMBRIAN ROCKS, the name given by Professor Sedgwick to the oldest known fossiliferous rocks, on account of their extensive development in North Wales. Their true limits have been the subject of considerable controversy. When Sedgwick first described them, they were considered inferior to the Silurian measures. Subsequent examination has shewn that they are the equivalents of rocks previously described by Murchison as Lower Silurian; and accordingly, geologists generally, following the classification of the government geological surveyors, confine the term to an extensive series of gritstones, sandstones, and slates, which underlie the Silurian Lingula beds. In Anglesea, these rocks have been metamorphosed in one place into chlorite and mica schists; in another, into gneiss, and all traces of organisms have been destroyed. In North Wales they are less altered, but have as yet proved unfossiliferous. In the Longmynd (Salop), there is an apparent thickness of 26,000 feet, which may be, however, owing to folds in the beds. A few fossils have been noticed here, consisting of a fucoid plant or two, the tracks of annelids, and the fragments of a supposed trilobite, called *Palæopyge Ramsayi*. In Ireland, similar rocks occur, containing two species of a small branched zoophyte, named *Oldhamia*, and numerous tracks and burrows of sea-worms.

CA'MBRIC, a general term applied to the finest and thinnest of linen fabrics. It is said to be derived from Cambrai, where such goods were first made. Some of the finest cambrics of the present day are produced in Switzerland. Scotch C. is really a muslin, being made of cotton with the fibre twisted very hard, to imitate real or linen cambric.

CA'MBRIDGE, the chief town of the country so named, lies 48 miles north-north-east of London. It takes its name from the river Cam, which was anciently called the Granta. By the Saxons, C. appears to have been known as GRANTABRYCGE, which is found with many slight variations of spelling, and probably became abbreviated into CANTBRICGE. It is also supposed that C., and not the adjacent village of Grantchester, was the GRANTACEASTER of the Saxons. There are, however, traces of a camp at Grantchester. In 870, the Danes ravaged the country hereabouts, and are said to have destroyed the town. King John, in the second year of his reign (1200 A. D.), granted a charter to the town, permitting it to have a guild of merchants, and in 1207, confirmed the burgesses in their privileges in perpetuity. In 1225, they paid a fine of 50 marks for having their liberties, and in 1227, Henry III. confirmed their charters. The town has sent two members to parliament from the earliest period. The university sends two members of its own. The population of the municipal borough in 1871 was 30,078, that of the parliamentary borough, 33,996. C. has 18 churches belonging to the Church of England, besides chapels belonging to the Baptist, Congregationalist, and other bodies. The most curious church is that of the Holy Sepulchre which is one of the few in England that have a round tower. The town is not generally pretty or picturesque, but the gardens at the backs of the colleges, by the Cam, are extremely beautiful in the summer months. Its architectural features depend chiefly on the college and university buildings.

CAMBRIDGE, University of, one of the two ancient institutions of the kind existing in England. Overlooking several fabulous accounts of its origin, its true history may be said to begin at the opening of the 12th century. It was in 1110 that Joffrid, Abbot of Croyland, sent over to his manor of Cottenham, near Cambridge, Gislebert, his fellow-monk and professor in divinity, with three other learned monks. These came over to Cambridge, and in a hired barn taught their sciences, and in a short space of time drew together so great a number of scholars, that in the second year of their coming no single building was able to contain them. Perhaps even this statement is doubtful. At anyrate, when Alfred of Beverley was student here—viz., 1129 A. D.—there were as yet no public halls or hostels, but each one lived in his own hired lodging.

The first regular society of students was that of Peterhouse, founded in 1257. About this time, students began to live together in hostels, under the rule of a principal, at their own charges. These hostels were named after the saints to whom they were dedicated, the churches which they adjoined, or the persons who formerly

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built or possessed them. In the year 1280, there were as many as 34, and some of them contained from 20 to 40 masters of arts, and a proportionate number of younger students; but all these hostels decayed by degrees when endowed colleges began to appear. Trinity hostel survived all the rest, and continued to 1540. The hostels were the beginning of what may be called the *college system*, which distinguishes the sister-universities of Oxford and Cambridge from those of Edinburgh, London, and the continent. See UNIVERSITIES.

It was between the latter part of the 13th and the close of the 16th century that all these royal and religious foundations were endowed which now constitute the university. Hugh de Balsham has the honor of being the first benefactor in this way. Michael House was founded by Hervey de Stanton in 1324, and King's Hall by Edward III. in 1332, both of which were absorbed into Trinity College by Henry VIII. in 1546. Clare Hall, as it used to be called, one of the earliest, and now one of the prettiest colleges in Cambridge, was founded by the Countess of Clare in 1326. Henry VI. has left himself an imperishable monument in the splendid foundation of King's College; and his queen, Margaret, commenced the foundation of Queens' College, which was added to by Elizabeth Widville, queen of Edward IV. Lady Margaret, Countess of Richmond and Derby, mother of Henry VII., founded Christ's College and St. John's at the beginning of the 16th c., and also the Divinity Professorship named after her. Henry VIII. appropriated part of the spoils of the monasteries to the foundation of Trinity College, and Queen Mary augmented the endowment. The five Regius Professorships were endowed by Henry VIII. Cambridge was frequently visited by the plague, and university proceedings were suspended by it in 1642 and 1666. In 1643, Cromwell took possession of the town, and the most eminent loyalists were expelled from the university. Almost all their colleges had sent their plate to the king at Nottingham. As might be expected, little was done for the university in this troubled century; indeed no new colleges were added until the founding of Downing College in 1800.

The predominance of the religious element in the college-discipline is to be attributed as much to the circumstances and manners of the times in which the colleges were founded, as to the piety of the founders themselves. There had been, from very early times, "Religious Houses," and these were in many cases united with the new collegiate foundations. There were, for example, the Dominicans, or Preaching Friars, whose house is now turned into Emmanuel College. The friars who lived in these convents were capable of degrees, and kept their "acts," or exercises for degrees, as other university men. There were, however, frequent quarrels between them and the other students. To the same cause is to be traced the condition of celibacy, upon which, with few exceptions, the fellowships were formerly tenable. Masters of colleges and professors may all marry, and the restriction in the case of Fellows has lately been removed or relaxed at most of the colleges. In like manner, the obligation to take holy orders as the condition of holding a fellowship, has been greatly relaxed at all the colleges. At St Peter's there are 11, and at Trinity Hall 10 lay fellowships.

The present university statutes were confirmed by Queen Victoria, by order in council, July 31, 1858. The governing body is the senate, and the building where they meet is called the senate-house. All university laws are approved by an elected body called the council, before they are submitted to the senate. The executive powers are entrusted to a chancellor, high-steward, vice-chancellor, commissary, and assessor. The public orator is the voice of the senate upon public occasions. The proctors superintend the discipline and morals of all persons in *statu pupillari*; they are present at all congregations of the senate, read the "graces," and take the votes. The registrary is responsible for the graces being offered in due form, and has charge of the university records. There are three terms in this university—the Michaelmas, or October term, the Lent term, and the Easter term. To take an ordinary B. A. degree, a student must reside nine terms. The M.A. degree follows three years after. Dissenters are not excluded by the terms of the new statutes from taking degrees, except in divinity.

With respect to the admission of students, their university course, expenses, and proceedings in degrees, the following information may be useful. There are four classes of students—viz., *Fellow Commoners*, and *Noblemen Pensioners*, *Sizars*, and the more distinguished students who are elected *Scholars* on the foundation or their

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college. The first class are so called from their dining at the Fellows' table; they wear silk or embroidered gowns, and pay heavier fees. The Pensioners are the great body of students who are not on the foundation, and who pay for their own commons, viz., dinners in hall, &c., and for their chambers. The Sizars are the poorer students, who are admitted at lower charges than the pensioners, but wear the same dress, and are no longer subject to the performance of menial offices as they once were. Some of the colleges, especially St John's and Trinity, have very liberal endowments for the sizars, and very considerable pecuniary assistance is given to the more deserving of them, so that no youth of real ability, industry, and good character, need be deprived by poverty of the advantages of a university education. Non-collegiate students have lately been admitted to the university under special rules. The Scholars are elected, by examination, from the pensioners and sizars; they are on the foundation of the college, have rooms and commons free, and other emoluments. The Fellows are subsequently elected from the scholars and the students who have distinguished themselves in the Tripos examinations. Vacancies are, as a rule, filled up from members of the college, but many fellowships are open to the competition of the whole university. The usual age of admission is from 17 to 20. Before a student can be admitted, he must obtain a certificate from some master of arts of the university of being sufficiently instructed in Latin, Greek, and Mathematics; this certificate must be sent to the tutor of the college along with the caution-money, which, in the case of a pensioner, amounts to £15. At some colleges there is an examination previous to matriculation in addition to the above.

Residence is commenced in the October Term. It is usual, particularly at the larger colleges, to have the name entered on the college boards for a term or two previous; but this is not necessary now, as it used to be, in order to *keep* such terms with a view to the degree. When the undergraduate comes into residence, he is called a "Freshman;" in his second year, a "Junior Soph;" in his third year, a "Senior Soph." The ordinary B.A., or Bachelor of Arts degree, may be taken in the ninth term of residence—viz., in the third June after coming up. The subjects of examination are partly fixed, partly variable. They are the Acts of the Apostles in Greek, one Greek and one Latin classic, "The History of the English Reformation;" "Euclid," Books i., ii., iii., iv., and Propositions 1—6 of Book vi.; together with certain parts of Algebra, Mechanics, and Hydrostatics. The candidates for examination for degree are called Questionists.

Candidates for mathematical "honors" do not go up till the end of their tenth term—i. e., the Christmas three years after coming up. The examination embraces the whole range of pure mathematics, and mathematics as applied to natural philosophy. The successful candidates are arranged in a Tripos—i. e., in three classes, called respectively Wranglers, Senior Optimes, and Junior Optimes; the first mathematician of the year is called the Senior Wrangler. The Smith's Prize Examination for the best mathematician sometimes reverses the decision of the tripos.

The examination for classical "honors" is one term later still, and the candidates are arranged in a tripos, and distinguished as First, Second, and Third Class. Very accurate scholarship is required to obtain a good place in this tripos. The examinations for degree are called "Great Go." The previous examination, which comes in the second year of residence, is called "Little Go." Students who intend to graduate in classical honors, are required to take mathematical honors in Little Go. The previous examination is one Greek and one Latin author, one of the Gospels in Greek, Paley's "Evidences of Christianity," and Elementary Mathematics. After passing the "Little Go," the examinations for the ordinary B. A. degree consist of a "General" and a "Special" examination, the subjects in the former being similar to those in the Little Go. The Special Examination is, at the option of the student, in Theology, Moral or Natural or Applied Science, or Law. The following are the professors: Regius Professors of Laws, Physic, Greek, Hebrew, and Divinity, Professor of Moral Philosophy, Professor of Chemistry, Professor of Anatomy, Professor of Modern History, Professor of Botany, Professor of Geology, Jacksonian Professor of Natural Philosophy, Downing Professors of Law and Medicine, Professor of Mineralogy, Professor of Political Economy, Professor of Archæology, Professor of Music, a Lady Margaret, a Hulsean, and a Norrisian Professor of Divinity, two Arabic Professors, a Sadlerian and a Lucasian Professor of Mathematics, a Lowndean and a Plumian Professor of Astronomy, Slade

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Professor of Fine Art, Professors of Latin, Sanscrit, International Law, Zoology, Experimental Physics, and Mechanism. Degrees in honors are given in Law and in Natural and Moral Science, without requiring further proficiency in the normal studies of the place, classics and mathematics, than is ascertained by passing the Little Go. The fees for the different degrees will be found in the "Cambridge Calendar." There are different fees at the different colleges in addition to the university fees. It will be sufficient to state, that for the B. A. and M. A. degrees the fees amount to about £12 and £25 respectively.

The great prizes at the university are the *Fellowships*, of which there are about 360, some open to all candidates without restriction, but conditions of tenure as to marriage and holy orders vary at different colleges. Their value varies from £100 to £300 per annum, and the Senior Fellowships are often £500 or more. There are also stipends attached to all the college offices—e. g., those of Dean, Bursar, Steward, &c. The office of Tutor is one of great honor and emolument. The Chancellor gives annually two gold medals, open to the competition of all students qualified to be candidates for the classical tripos of the year. The members of parliament for the university give annually four prizes for the best dissertations in Latin prose. There are numerous other university distinctions, both scholarships and of other kinds, for an accurate account of which the "Cambridge Calendar" should be consulted.

The following is a list of the colleges in the order of their antiquity. A particular notice of each college (except Cavendish) will be found in its alphabetical place.

Name.	Founded.	Undergraduates in 1875.
St Peter's College, or Peter-house	1257	87
Clare College	1326	85
Pembroke College	1347	78
Gonville and Caius College	1348	189
Trinity Hall	1350	140
Corpus Christi, or Benedict College	1351	144
King's College	1441	98
Queens' College	1448	38
St Catherine's College or Hall	1473	57
Jesus College	1496	144
Christ's College	1505	108
St John's College	1511	381
Magdalene College	1519	50
Trinity College	1546	522
Emmanuel College	1584	63
Sidney Sussex College	1 98	46
Downing College	1800	51
Cavendish College	1876	..

Students whose names are not on the boards of any college, and are allowed to pursue their studies and proceed to degrees, were 82 in number at the above date.

Few of the colleges present an imposing façade to the streets—King's is, perhaps, the only one of which this may be said—but the quiet and picturesque beauty of the courts in the interiors is very pleasing. Dr Whewell, the late Master of Trinity College, built a new hostel in connection with Trinity, which is considered to be in very good taste. Amongst the other public buildings of Cambridge are to be mentioned the Senate-house, where university examinations are held, degrees conferred, and all public business of the university conducted. The Fitzwilliam Museum is the finest of the modern additions to the university. Viscount Fitzwilliam bequeathed, in 1816, £100,000 South-sea Annuities, the interest of which was to build and support a museum. He left also a very valuable collection of books, paintings, &c., as a nucleus for future contributions. G. Basevi was the architect. The University Library is a fine mass of buildings of different periods, and contains at present more than 170,000 volumes. The Geological Museum contains the original collection of Dr Woodward, which, out of respect to the founder, has been kept in its original state, unmixed with more recent and vastly more numerous and interesting acquisitions. The university is indebted for many of these geological treasures to

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the late Professor Sedgwick. The Mineralogical Room contains the valuable collections of the late Sir A. Hume, Charles Brooke, and Henry Warburton. The Pitt Press is a Gothic structure built in honor of Mr Pitt, who was educated at Cambridge. It contains the university printing-offices, which are very extensive. There is also a good Anatomical Museum.

There is a very good hospital founded under the will of Dr Addenbrooke in 1753. The observatory contains some very fine instruments, amongst which is a large equatorial telescope, presented by the Duke of Northumberland in 1835. The income of the university is about £2,000, and the aggregate income of the colleges, about £200,000 per annum.

For the most recent information about the university studies, &c., the Cambridge "Calendar" for the current year should be consulted; for the history, biography, and antiquity, see Fuller's "History of Cambridge;" Dyer; Caius; Le Keux' "Memorials;" Cooper's "Annals;" Cooper's "Athenæ Cantabrigienses;" "Graduati Cantabrigienses."

CAMBRIDGE, a town of the state of Massachusetts, on the Charles River, 8 miles to the north-west of Boston (q. v.). Here, in 1638, within eighteen years after the landing of the Pilgrim Fathers, was founded, Havard University by the Rev. John Harvard, who bequeathed it a legacy of about £780, and which has gradually been endowed to the amount of 1,000,000 dollars, so that its vested income must be at least 60,000 dollars or £12,000. The oldest, it is also generally considered the best, institution of the kind in America. In addition to the collegiate department proper, the university includes a theological, law, scientific, and medical school, and a department for such as wish to prepare themselves for business avocations without going through a classical course. In 1875, the students amounted to 1161. The town of C. is rapidly advancing in population, the census in 1830, 1840, and 1850 respectively having been 6072, 8409, and 15,215; that of 1870 was 39,634. In 1880 the pop. was 52,669.

CA'MBRIDGESHIRE, an inland county of England, in lat. 52° 1—52° 45' n., long. 0° 31' e., and 0° 16' w. Its greatest length, from north to south, is about 50 miles, and its breadth 30 miles, with an area of 820 sq. miles. Pop. (1871) 186,906. About three-fourths of the county consists of arable land, meadow, and pasture, the rest being fens. The surface of C., except in the south, which is somewhat elevated and on the chalk formations, is marshy and flat, thinly wooded, and with villages and churches here and there on slight elevations called "eys" or islands. The upper greensand, which in some places near Cambridge comes to the surface, yields in rich abundance the curious fossils miscalled coprolites (q. v.) which are of great value as an artificial manure. Their value is in some places equal to that of the land itself. The northern part of C. forms part of the Bedford Level. The chief rivers are the Ouse, which crosses the middle of the county from west to east, with its tributary the Cam; the Nene, which borders the county on the north; and the Lark. These are all navigable to a certain extent. C. is an agricultural county. In the higher parts, the land produces fine crops of beans and wheat. Many cattle and sheep are now supported on the thin, chalky soils. The black spongy soil of the fens consists of mud mixed with decayed vegetable matter, and when drained and burned, produces, in dry years, heavy crops of cole-seed, wheat, oats, barley, hay, potatoes, hemp, and flax. Horses, cattle, sheep, and pigeons are also reared in the fens. The Isle of Ely, part of the fen-tract, and within the Bedford Level, is famed for garden vegetables; and the meadows of the Cam yield fine butter and cream-cheese. The chief towns of C. are Cambridge, the county town; Ely, Wisbeach, March, Thorney, Linton, Soham, Newmarket, and Royston. The manufactures of C. are mostly such as belong to an agricultural county. There are paper and parchment mills, and coarse earthenware is manufactured. Needle-making is also carried on to some extent. C. returns 3 members to parliament. This county was anciently the seat of a powerful tribe—the Iceni. It was crossed by several British and Roman roads, in some parts now covered by several feet of peat-soil. Remains of Roman camps, sea-embankments, and villas, occur, and Roman antiquities, as coins and urns, have been found. There are some ancient—supposed pre-Roman—ditches miles in length. One of these, the Devil's Ditch, with an elevated vallum, having a slope of 52 feet on one side and 26 feet on the other, is about 100 feet broad. In the 9th and 10th cen-

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turies, C. was the scene of severe contests between the Danes and Saxons. The Isle of Ely and its monks withstood William the Conqueror for 8 years. C., and especially the Isle of Ely, suffered much in the civil wars of Stephen, John, Henry III., and Charles I. There formerly existed 36 religious houses in Cambridgeshire. Since Charles I.'s time, much fen-land has been reclaimed by embanking rivers and cutting new channels.

CAMBUSLANG, a parish and mining village in Lanarkshire celebrated in the revivals of 1741. See WHITEFIELD.

CAMBY'SES, second king of the Medes and Persians, was the son of Cyrus and Cassandane, and succeeded his father in the monarchy, 529 B. C. C. is the Greek form of his name, the ancient Persian name is Kabujiya. In 520 B. C., C. invaded Egypt, defeated Psammenitus, the king of Egypt, at Pelusium, and in six months made himself master of the whole country. He meditated further conquests, but was not permitted to carry his designs into effect; the Tyrians, upon whom his maritime power depended, refused to serve him against the Carthaginians; an army which he sent to take possession of the temple of Jupiter Ammon, perished in the desert; and one which he led in person against the Ethiopians, was compelled to return for want of provisions. C. now addicted himself to excessive intoxication, and perpetrated horrid cruelties in Egypt; the accounts of which, however, depending upon his enemies, the Egyptian priests, are doubtless exaggerated. It is probable, however, that his tendency to epileptic fits, along with the arbitrary disposition induced by success and power, caused him to indulge in violent and capricious acts of tyranny. The Egyptians believed him to be mad. A pretender to the Persian throne having appeared, C. marched against him, but died on the way in Syria, 521 B. C.

CAMDEN, Charles Pratt, Earl of, a younger son of Sir John Pratt, Chief Justice of the Court of King's Bench in the reign of George I., was born in 1714. Educated at Eaton and Cambridge, he studied for the law, and was called to the bar in 1738. Not until 1752, however, when he defended a bookseller successfully against a government prosecution for libel on the House of Commons, did C.'s prospects appear very promising; from this time his success was certain. In 1757, he was appointed Attorney-general, and four years afterwards, accepted a seat on the bench in the Court of Common Pleas. Judge in the trial of Wilkes, he declared his opinion emphatically that the action of government in this case, by general warrants, was altogether illegal—an opinion which, chiming in with public sentiment at the time, made him the most popular of judges. In 1765, he was created Baron C. of Camden Place, Kent, by the Rockingham administration; to whose American policy, and to their treatment of Wilkes, notwithstanding, he offered constant opposition. The following year, when he was made Lord Chancellor, he did not abandon his principles; and four years after—the Duke of Grafton being then prime minister—he supported an amendment made by Chatham, on the government address, and resigned his place. His judicial career ended here; henceforth, he was entirely a political character, and for more than 20 years took an active part against the ill-advised American policy pursued by Lord North, and in discussions on the law of libel, in which he maintained the popular view. As a judge, he is held in high estimation, though his manner was somewhat undignified. He filled the office of President of the Council in the Rockingham administration in 1782, and also from the following year until his death, under Pitt. He died April 1794.

CAMDEN, William, one of the most distinguished scholars and historians, and the most laborious and painstaking antiquary of the 16th c., was born in London, where his father was a paper-stainer, in May, 1551. His education commenced at Christ's Hospital, was completed at St Paul's School, and at Oxford. In 1575, he was appointed second master of Westminster School; and it was while discharging the duties of this office that he undertook the work which has made his name famous, his "Britannia," giving an account of the British Isles from the earliest ages, which, written in elegant Latin, was first published in 1586. It at once brought him into communication with the learned men of his time. Before 1607, the work had passed through six editions, being greatly enlarged and improved by the indefatigable industry of the author. The book, at first but a comparatively small single volume, has received much additional matter from other writers. The best known

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edition of C.'s "Britannia," is that of Edmund Gibson, in English, 2 vols. fol. Of this great work of C., Bishop Nicholson said it was "the common sun whereat our modern writers have all lighted their little torches." In 1593, C. was appointed head-master of Westminster School; and four years later, he was made Clarencieux King-at-arms, an appointment which gave him more time for the pursuit of his favorite studies. His other most important works are—"Annals of the reign of Elizabeth;" "A Collection of Ancient English Historians;" "An Account of the Monuments and Inscriptions in Westminster Abbey; and a "Narrative of the Gunpowder Plot." He died in 1623, at the age of 72, and was buried in Westminster Abbey. Before his death, he endowed a professorship of history at Oxford. The "Camden Society," for the publication of early historical and literary remains, is so named in his honor.

CA'MDEN, a city of New Jersey, U. S., on the left bank of the Delaware River, opposite Philadelphia, with which it is connected by 4 steam-ferries. It is the terminus of the Camden and Amboy, Camden and Atlantic, and West Jersey Railways. It has a court-house, 2 banks, 2 railway dépôts, 15 churches, ship-yards, iron-works, foundries, manufactories of machinery, &c. Pop. (1870) 20,045; (1880) 41,659.

CA'MEL (*Camelus*), a genus of quadrupeds of the order *Ruminantia*, of which only two species exist, both of great use to mankind. This genus is the type of the family *Camelidæ*, to which there belongs only one other genus, *Auchenia* (q. v.), including the llama, alpaca, &c. The whole number of species of *Camelidæ* is, therefore, very small, and they seem to belong originally to limited regions, both in the Old World and in the New. To the peculiarities of these regions, they exhibit a wonderful completeness of adaptation. The family is regarded as forming a sort of link between the orders *Ruminantia* and *Pachydermata*. The dentition differs from that of all other ruminating animals, particularly in the presence of incisors or cutting teeth in the upper jaw; camels having also canine teeth in both jaws, and the llama and its congeners in the lower jaw of both sexes; and differences equally important appear in the feet, which have not the cloven hoof common to all the rest of the order—two short toes with separate hoofs adapted to one another—but two elongated toes, each tipped with a small nail-like hoof, the feet resting not upon the hoofs, but upon elastic pads or cushions under the toes.—In the camels, the toes are united by a common sole, thus resting upon one extended pad, instead of having each a separate one, as in the genus *Auchenia*; the broader expanse of the foot enabling the animals of the one genus more easily to traverse the loose sand of the desert, whilst the separation of the toes in the other is suited to the uneven surface of rocky heights. The camels are also distinguished by the females having four teats, whilst those of the other genus have only two; and by a hump or humps upon the back, of which the llama and its congeners exhibit no trace. The long neck, small head, prominent eyes, and tumid and cleft upper lip, with considerable prehensile power, are common to both genera; but with much similarity of form, as well as of particular characters, the *Camelidæ* of the Andes exhibit a gracefulness of outline which strongly contrasts with the gaunt angularity of those of the eastern deserts. Camels are indeed animals of uncouth appearance. Of the two species, that known as the Arabian C. (*C. Dromedarius*) has only one hump on the back, whilst the Bactrian C. (*C. Bactrianus*) has two. Some confusion has arisen from the occasional employment of the name Dromedary as a designation of the former species, it being, however, more properly limited to a particular variety of that species, more slender and graceful than the ordinary variety, and of much greater fleetness. Buffon's notion, that the hump is a badge of servitude, and the consequence of harsh treatment throughout many generations, is singularly at variance with what we know of its uses. The hump on the C.'s back is a wonderful provision of nature, to adapt the animal to the endurance of long abstinence from food, or subsistence on very scanty supplies, to which it is often subjected in the desert, and without a capacity for which it would be comparatively of little value to man; and the wide deserts across which he journeys and transports his merchandise by its aid, would be altogether unpassable. The hump is, in fact, a store of fat, from which the animal draws as the wants of its system require; and the Arab is very careful to see that the hump is in good condition before the commencement of a journey. After it has been much exhausted, three or four months of repose and abundant food are necessary to restore it. The back

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bone of the C. is as straight as that of other quadrupeds.—Another very interesting adaptation to the desert is to be noticed in the thick sole which protects the feet of the C. from the burning sand, and in callosities of similar use on the chest and on the joints of the legs, upon which the C. rests when it lies down to repose, or kneels, as it does for various purposes, and is taught to do that it may be loaded, or that its rider may mount upon its back. The wedge-shaped cutting-teeth of the lower jaw are also particularly fitted for browsing on shrubby plants, such as the desert produces—the camel's thorn, tamarisk, &c., which form a large part of the food of the C.; the eyes are furnished with long eyelashes to protect them from the glare and from the drifting sand; whilst the exclusion of the sand from the nostrils is also provided for by a power of closing their oblique openings at will. But most interesting of all is the provision made for the C.'s endurance of long drought, by the lining of the inside of the second stomach, or honeycomb bag, and of a portion of the first stomach or paunch, with great masses of cells, in which water is stored up and long retained. This store of water is well known to the Arabs, who, when sore pressed by thirst, sometimes avail themselves of it by killing some of the camels of the caravan.—The first stomach of the *Camelidæ* is divided into two compartments by a muscular band—one of the points of difference between them and the other ruminants. Muscular bands, proceeding from this principal one, and intersected by other muscular bands, nearly at right angles, form the cells for containing water. It may be added here, that the senses both of sight and of smell are extremely acute in the C., and that it is capable of discerning water at a great distance.

The Arabian C. carries twice the load of a mule. The Bactrian C. is sometimes loaded with 1000 or even 1500 lbs. weight, although not generally with so much. The East India Company had at one time a corps of camels, each mounted by two men, armed with musketoons. The use of the C. for the conveyance both of travellers and merchandise has won it the name of the *ship of the desert*. A caravan sometimes contains 1000, sometimes even 4000 or 5000 camels. The supply of food carried with the caravan for the use of the camels is very scanty: a few beans, dates, carob-pods, or the like, are all that they receive after a long day's march, when there is no herbage on which they may browse. The pace of the loaded C. is steady and uniform, but slow: it proceeds, however, from day to day, accomplishing journeys of hundreds of miles at a rate of about 2½ miles per hour. Some of the slight dromedaries, however, can carry a rider more than 100 miles in a day. The motion of the C. is peculiar, jolting the rider in a manner extremely disagreeable to those who are unaccustomed to it; both the feet on the same side being successively raised, so that one side is thrown forward, and then the other.

The C. produces only one young one at a time, or rarely two. It lives 30 or 40 years.

The patience of the C. has been celebrated by some authors; and the cries by which it expresses its sense of injury when a heavy load is placed upon its back have been pathetically described. With all its general submissiveness, however, the C. is resentful of injury, and during the rutting season it becomes particularly vicious.

The flesh and the milk of the C. are much valued by the Arabs as articles of food. The dung is used for fuel, and it was from the soot of this dung that the sal-ammoniac, formerly imported from Egypt, was obtained by sublimation, whilst the sources from which that substance is now procured were unknown. The hair is used for the manufacture of cloth, some kinds of which are coarse, and others comparatively soft and fine. C.'s hair is also imported into Europe for the manufacture of the pencils or small brushes used by painters. The C. can now scarcely be said to exist anywhere in a wild state. It has lately been introduced into Australia.

A fossil species of C. (*C. Sivalensis*), larger than either of the existing species, has been discovered in the tertiary deposits of the Sewalik Hills, in Hindustan.

CA'MELFORD, a town in the north-west of Cornwall, near the source of the Camel (crooked brook), 14 miles west of Launceston. It lies in a high and hilly tract near the moors. Pop. about 1600. C. is said to have been the scene of a battle, in 542, between King Arthur and Mordred, his nephew, when both were slain. The West Saxons, under Egbert, had a battle with the Britons here in 823. The ruins of King Arthur's Castle, Tintagel, stands on the high rocky coast, 4 miles north-west of

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Camelford. Two miles north of C. are the celebrated slate-quarries of Delabole, employing a large number of men. Macpherson, the author or translator of Ossian, was member of parliament for C. in 1791, but the Reform Act of 1832 disfranchised the borough.

CAME'LLIA, a genus of plants of the natural order *Ternstræmiaceæ* (q. v.) natives of China, Japan and the north of India—some of which are now among the most common and admired green-house shrubs in Britain and other countries too cold for their cultivation in the open air, receiving the same sort of attention which is bestowed on other florists' flowers, and with the same result, of an endless multiplication of beautiful hybrids and varieties. The best known and most esteemed is *C. Japonica*. Its leaves are ovate-elliptical, almost acuminate and serrate, shining; the flowers without stalks, mostly solitary, large, and rose-like. It is a native of Japan; and there and in China it has been carefully cultivated from time immemorial. In its wild state, it has red flowers; and the red single C. is much used by gardeners as a stock on which to graft the fine varieties, the flowers of which are generally double, and in many cases most completely so. Many of them are of Chinese or Japanese origin; many have been raised by cultivators in Britain, continental Europe and America. Their colors are very various; and the varieties also differ much in the form and position of the petals. It adds to the value of the C. that its flowering time is in autumn, winter and spring. By those who can afford the expense, entire houses are often devoted to the culture of camellias. Some cultivators are careful to protect them from direct sunshine, others recommend an opposite treatment in this particular; it is agreed by all that free access of air is of great importance, and that water must be given very liberally, yet with such caution that the soil may never remain soaked after the immediate wants of the plant are supplied. The cultivation of camellias in the windows of houses is often attended with disappointment, from the buds dropping off when almost ready to expand, which is generally owing either to a neglect or an excess of watering; an apparently slight mistake, either of the one kind or of the other, being very speedily productive of this evil. Too much heat at this time is also apt to cause the flower-buds to fall off. The C. flowers well, when the temperature is kept not very much above the freezing-point, but frost it cannot bear. In the south of England, some of the varieties are occasionally trained to walls in the open air, receiving a little protection in winter. The proper soil for camellias is a loose black mould; a little sand and a little peat are often advantageously mixed with loam to form it. Camellias are often propagated by cuttings; often by layers; but the finest varieties very generally by grafting or by inarching. The single C. is also propagated by seed, and in this way the best stocks for grafting are procured.—Of the other species of C., the most hardy, and one of the most beautiful is *C. reticulata*, from which not a few of the varieties now in cultivation are partly derived.—*C. oleifera* is extensively cultivated in China—not, however, in the more northerly parts—for its seeds, from which an oil is expressed after boiling, very similar to olive oil, and much in use as an article of food and otherwise in the domestic economy of the Chinese. The seeds of almost all the species, however, yield this oil.—*C. Sasanqua* bears the name of SASANQUA TEA. It is cultivated in China for the sake of its flowers, which are said to be used for flavoring certain kinds of tea.

CAMELOPARDA'LIS. See GIRAFFE.

CAMEL'S THORN (*Alhâgi*), a genus of plants of the natural order *Leguminosæ* (q. v.), sub-order *Papilionaceæ*, containing a number of herbaceous or half-shrubby species, natives chiefly of the deserts of the east, having simple leaves, minute stipules, racemes of red flowers, and jointed pods with one seed in each joint. These plants are of great importance on account of the food which they afford for camels, where other vegetation is far from being abundant; and camels are particularly fond of them. *A. camelorum*, a herbaceous species, yields a kind of Manna (q. v.), which appears in the form of drops, as of honey, on the leaves, and gradually hardens. A similar exudation is yielded by *A. Nipalensis*, another herbaceous species; but it is not certain that the manna of Persia and Bokhara is produced, as has been alleged, by *A. Maurorum*, a shrubby species two or three feet in height, which certainly does not yield it in India or Egypt; the supposition that this exudation results from some peculiarity in the climate of Persia and Bokhara, being perhaps less probable than that of a mistake concerning species not very dissimilar.

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CA'MEO (Ital. *cameo*). Gems cut in relief are called cameos, in opposition to those that are hollowed out so as to yield a raised impression, which are called *Intaglios*. The term C., however, is applied more especially to those diminutive pieces of sculpture which are prepared from precious stones having two strata or layers of different colors, the undermost of which is left to form the background, the object to be represented being cut in the upper one. The stone generally used for this purpose by the ancients was the variegated onyx.

The art of C.-cutting is of great antiquity. It is believed to have been of Asiatic origin, and to have been practised by the Babylonians, from whom the Phœnicians carried it into Egypt. From the Egyptians, it was transmitted to the Greeks, who brought it to great perfection; and latterly it was practised very extensively, and more successfully than perhaps any other art, in Rome. To what extent the gems, commonly called Etruscan, are in reality early Greek, is a subject of dispute amongst the learned. It was not till a comparatively late period—the age following Praxiteles—that C.-cutting became popular in Greece; and it was in the courts of the successors of Alexander that it was chiefly patronised. At this period, cameos were very extensively used, not only as personal ornaments, but in cups, vases, candelabra, and other objects of domestic luxury. Pateræ and other vessels were frequently worked out of a single stone, upon which were exhibited a whole series of figures of the most exquisite workmanship. Many of the antique cameos which have been preserved are wonderfully beautiful both in design and execution. The finest specimen in existence is said to be the Gonzaga C., formerly at Malmaison, now at St Petersburg. It represents the head of a prince and his wife, probably Ptolemy I. and Eurydice. Winckelmann mentions a C. representing Perseus and Andromeda, in such high relief, that almost the whole contour of the figures, which are of the most delicate white, is detached from the ground. It belonged to the painter Mengs, and at his death was purchased by the Empress Catharine of Russia. The only other gem which Winckelmann is disposed to rank with that just mentioned, is "the Judgment of Paris" in the cabinet of the Prince Piombino at Rome. Of cameos of the Roman time, many fine specimens are to be found in the continental museums. The most celebrated C. in England is the "Cupid and Psyche," in the Marlborough Collection, by Tryphon, who is supposed to have lived in Macedon under the immediate successors of Alexander. The stones on which many of these cameos are cut are of surprising, and, in modern times, unequalled size and perfection. They are supposed to have been procured by the ancients through their oriental and African commerce. Cameos do not seem to have been made in medieval times; but the art revived in Italy, under the auspices of the Medici; and the production of cameos, both in *pietra dura* and in shell, has there become a branch of art-manufacture of considerable importance. Impressions from antique cameos in glass, sulphur, porcelain, and other materials, are produced in many places; and for artistic purposes, possess all the value of the originals.

Glass Cameos.—The manufacture of cameos from artificial substances was not unknown to the ancients. One of the most beautiful specimens of an imitation of C. in glass is the famous Barberini or Portland Vase, now in the British Museum. The ground is blue, the figures, which are in low relief, being of a delicate, half-transparent white. See PORTLAND VASE. Many fragments of the same kind of manufacture exist in other cabinets, but that which we are fortunate enough to possess is believed to be the only perfect example.

Shell Cameos.—The art of imitating cameos in shell, which has now attained to such perfection as to rival the delicacy and finish even of antique workmanship, and which is a process quite as artistical as their production from gems, is of modern invention. The shells, like the stones, chosen for this purpose, are such as possess layers of different colors. The most useful are the *Bull's Mouth*, the under layer of which is red, resembling the sardonyx; the *Black Helmet*, which has a dark onyx ground; and the *Queen's Conch*, of which the ground is of a pinkish hue. These shells have three strata, the undermost of which forms the ground, the figure being sculptured in the second, and the third serving to mark the hair, wreaths, armor, and other more prominent objects. The portion of shell having been prepared of the requisite size, form, and thickness by various mechanical means, it is fixed by some adhesive substance—usually rosin—to a small block of wood, of such

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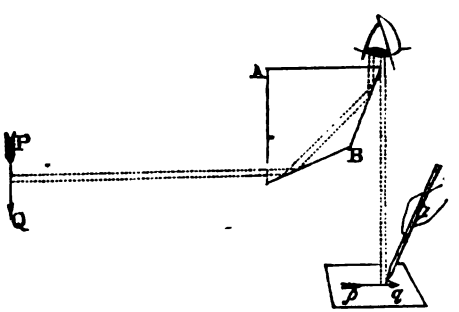
form and thickness as to be conveniently grasped by the artist in his left hand. The outline of the object or objects to be represented is then sketched with a pencil, and, in the case of portraits, is usually copied from a previous pencil-sketch on paper. The pencil-marking on the shell is then followed with a scratch-point, and the surrounding white substance is removed by means of files and gravers. This latter process, which is more mechanical than the rest, is usually performed by an assistant. The artist then proceeds slowly and carefully to work out his subject by the use of smaller tools; those used at last for deepening the finer lines being scarcely larger than ordinary darning-needles. The manufacture of shell-cameos in Rome commenced about 1805, and is said to have been of Sicilian origin. The art was at first confined to Italy; but during the last 35 years, it has been carried on in Paris to a greater extent than even in Rome, though not with equal success. A large proportion of the whole cameos manufactured in France are imported into England, and many of them are mounted as brooches, and exported to the United States and the British colonies. Saolini and Giovanni Dies have long been celebrated as artists in shell-cameo in Rome, whilst Girometti has enjoyed a similar reputation for his works in *pietra dura*.

CA'MERA LU'CIDA, an optical instrument constructed of various forms, and for various purposes. Dr Wollaston's C. L., intended to facilitate the perspective delineation of objects, consists of a small quadrilateral prism of glass, of which AB in the annexed figure is the perpendicular section, held in a brass frame, which is



attached to an upright rod, having at its lower end a screw-clamp, to fix it to the edge of a table. The prism being at the height of about a foot from the table, has its upper face horizontal. Two of its faces, as in the figure, are at a right angle at A; the contiguous faces make respectively with them angles of 67½°; so that the remaining obtuse angle at B contains 135°. Rays coming from an object PQ, and falling nearly perpendicularly on the first surface, enter the prism and undergo total reflection at the contiguous surface (see DIOPTRICS); they then fall at the same angle on the next surface, and are totally reflected again; finally, they emerge nearly perpendicularly to the remaining surface. An eye, as in the figure, then receives the emergent pencil through one part of the pupil, so that an image, *pq*, of the object is seen projected upon a sheet of paper upon the table. The rays from the drawing-pencil passing the edge of the prism, enter the other part of the pupil; and the pencil and image being seen together upon the paper, a sketch of the latter can be taken. There is, however, a practical difficulty—the image and the drawing-pencil are at distances sensibly different from the eye, and so cannot be seen together distinctly at the same time. To obviate this, a plate of metal, with a small aperture as an eye-hole, is placed at the edge under the eye, so that the rays through

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the prism, and those from the drawing-pencil, which both pass through the eye-hole, form only very small pencils. By this, the difficulty is greatly diminished. It is still, however, difficult to use the instrument satisfactorily; and though many acquire great readiness in its use, others have never been able to attain the same facility. The instrument is remarkable for its small bulk and portability. A good one will pack in a box 8 inches by 2, and half an inch deep. Besides this form of the C. L., which is the most common, there are others. Its simplest form is merely a piece of smooth glass fixed at an angle of 45° to the horizon. An image from a horizontal object falling on this glass will be perfectly reflected, and that in the vertical, so that the eye looking vertically down will see the image, and, owing to the transparency of the glass, the artist will be able to trace it out upon paper below. In this case, however (see CATOPTRICS), the image will be inverted.

CAMERA OBSCURA (literally, a dark chamber), an instrument invented by Baptista Porta in the 16th century. It is known in its simplest form as a familiar toy, consisting of a rectangular box, furnished at one end with a lens whose focal length is equal to the length and depth of the box; at the opposite end of which a plane reflector is placed at an angle of 45°, which throws the image of any objects to which the lens may be directed on a piece of ground-glass on the top of the box in a non-inverted position, so that they may be viewed or sketched from as in nature.

The C. O. being now an indispensable article in the practice of photography, has received a number of recent improvements, which make it rank as a scientific instrument. The principle, however, involved in the simplest and most refined forms is the same, and may be illustrated and made intelligible by the following experiment: Let a small hole be bored in a window-shutter, and the room be darkened. If now, the beam of light entering the room by this hole be intercepted by a sheet of white paper, held at a small distance from the hole, an inverted image of objects without will be seen upon the paper. By placing a small convex lens over the hole, this image is rendered much more distinct, or *sharp*, in photographic language. Moreover, it will be found that, at a certain distance from the hole, the image attains a maximum degree of sharpness; and that if the paper be removed from this point to any position either nearer to the hole or further from it, the image becomes indistinct and confused. At the point of greatest distinctness the image is said to be *focused*. Such being the principle of the camera, it is evident that in practice the instrument may assume many forms, provided always that it consists of a darkened box or chamber having a hole at one end for the insertion of a lens, or combination of lenses, and at the other a screen, generally made of ground-glass, on which to receive the image.

The body of the instrument may be made of any opaque substance; the tube or tubes are generally formed of brass, and contain one or more lenses; and there is the obscured or ground-glass, upon which the image is thrown for the purpose of adjusting the focus; and the rack behind, by means of which, and the double sides of the camera, the body of the instrument may be lengthened or shortened till the image on the ground-screen is accurately focused. This rack is most frequently placed upon the tubes carrying the lenses. The interior of the whole apparatus is blackened, to prevent reflection of the rays falling on their sides, and to impart greater distinctness to the picture. The *camera-slide* is a thin dark box, and is used for conveying a sensitive plate from the operating-room to the camera, and back again after exposure. It consists of a rectangular frame, made to fit exactly into the back of the camera when the focusing-screen is removed. At the back is a hinged door, by means of which the plate is introduced into the slide; and in front is a shutter, which is pulled up when the plate is to be exposed, and shut down after the time requisite for the action of the light upon the plate has expired. It must be constructed so that, when substituted for the focusing-screen, the surface of the prepared plate, which is intended to receive the image, shall correspond exactly in distance from the lens with the ground-surface of the focusing-screen. The plate rests upon projections of silver wire in the corners of the slide; and the same slide may be used for plates of different sizes, by introducing into it thin frames of suitable dimensions also furnished with silver-wire corners.

Photographic cameras are generally required for one of three purposes—viz., portraits, landscapes, or copying; and for each of these it is necessary to make suitable

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modifications in the construction of the instrument. A camera has, however, been recently contrived which combines within itself the conditions necessary for all contingencies. It is called Martin's Universal Portrait, Landscape, and Copying Camera, and consists, primarily, of a base-board, 30 inches long and 11 inches wide, divided into three pieces, and hinged together by means of broad brass hinges, so as to diffuse the bearing as much as possible, and bolted together when in use by sliding panels of mahogany, extending across the entire width of the base-board. This base-board being grooved on its outer edges, allows the sliding portions of the camera to be moved from one end to the other, so as to alter the relation between object, lens, and image *ad infinitum*.

What may be regarded as the body of the camera, is of the same construction as an ordinary expanding camera, except that it is furnished with additional apertures for camera slides, and the front and the back are united by the means of an accord on or bellows body of suitable length to extend from one end of the base-board to the other.

CAMERA'RIUS, Joachim—originally, *Liebhard*, which name he changed into C., because his forefathers had been *Kämmerer* (chamberlains) at the court of the Bishop of Bamberg—was born at Bamberg, April 12, 1500, and died at Leipsic, after a life devoted to literature, April 17, 1574. He was by nature earnest and taciturn; but the extent of his knowledge, his sobriety of opinion, strength of character, and, when he pleased, overpowering eloquence, won for him the esteem of all his contemporaries. His works, of which several still remain valuable, include an excellent biography of Melanchthon, and a collection of letters by this reformer; also, annotations on Cicero's "Quæstiones Tusculanæ" (1525), "Elements of Rhetoric," "Commentarii Linguæ Græcæ et Latinæ" (1551), and "Epistolæ Familiares" (1583—1595), giving interesting notices of his times.—His son, JOACHIM C. (b. 1534, d. 1598), was one of the most learned physicians and botanists of his age.

CAMERI'NO (ancient *Camerinum*), a town of Central Italy, in the province of Macerata, situated on a hill at the foot of the Apennines, 41 miles south-west of Ancona. It has a cathedral, occupying the site of a temple to Jupiter, a university, and some manufactures of silk. Its bishopric dates from the 3d c.; and it was made an archiepiscopal see in 1787. Pop. 5500.

CA'MERON, John, a famous scholar and divine, was born at Glasgow about the year 1580, and educated at the university of that city, where, in his 20th year, he held an appointment as reader in Greek. In 1600, he set out to travel in France, where his ability and erudition secured for him a philosophical professorship in the university of Sedan. He afterwards acted as a Protestant clergyman at Bordeaux, and on the death of Gomarus, was appointed to the divinity chair in the university of Saumur, an appointment he held until 1620. Returning to Britain, he was appointed professor of divinity at Glasgow; but in less than a year he returned to Saumur; thence to Montauban, where he received a divinity professorship. Here his opposition to the party who advocated a civil war made him many enemies, by one of whom he was stabbed in the street; and he died from the effects of the wound in 1625. He was considered one of the best scholars of his time; in biblical criticism, he was inclined to be perverse; where there was a difficulty he usually chose the opposite view to that held by other divines, especially Beza. His theological opinions were of a somewhat lax character, his works being said to be the foundation of Amyraut's doctrine of universal grace.

CAMERON, Richard, a Scottish Presbyterian preacher in the 17th c., who suffered death for the cause he espoused, and from whom the religious sect ordinarily called Cameronians (q. v.) has been named. C. belonged to the extreme party, who held by the perpetually binding obligation of the Solemn League and Covenant (see COVENANTS), which were set aside at the restoration of Charles II. Along with some others, he strenuously resisted those measures that reinstated the Episcopal Church in Scotland, and that proscribed the meetings for public worship of unauthorised religious bodies. Contrary to law, he persisted in preaching in the fields, and became obnoxious to government, to which, indeed, he finally assumed an attitude of defiance. In June 1680, he, in company with about twenty persons of equal zeal, well armed, entered the town of Sanquhar; and in the market-place they for-

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nally renounced their allegiance to Charles II., who had so grossly abused his power, and declared war against him and all his adherents. After this act, they retired to the hills between Nithsdale and Ayrshire, where they succeeded in evading capture for a month, though a price of 5000 merks had been set upon C.'s head by government, and 3000 upon the heads of the others. On the 20th July 1680, however, they were surprised by a vastly superior force in Aird's Moss, and after a brave fight, C. was killed. His hands and head were cut off, and fixed upon the Netherbow Port, Edinburgh. C. ranks as a martyr, and has an honorable place in the history of "Scots Worthies."

CAMERON, Verney Lovett, the African traveller, son of the Rev. J. H. L. Cameron, vicar of Shoreham, Kent, was born in 1844. He entered the navy in 1857, and served some time on the east coast of Africa. In 1873 he took charge of an expedition to relieve Livingstone, his orders being to join him by the nearest route. He started from Bagamoyo in March, and in August at Unyanyembe, met Livingstone's followers bearing his remains to the coast. After making arrangements for their safe arrival, he proceeded to Ujiji, where he found some of Livingstone's papers and a map, which he forwarded to Zanzibar. He then made a survey of Lake Tanganyika, which he found to be disconnected with the Nile system. In the belief that the Lualaba was the upper waters of the Congo, he resolved to follow its course to the west coast; but owing to the hostile interposition of the native chiefs was prevented from verifying a conviction, the correctness of which was soon afterwards demonstrated by Stanley. Taking a more southerly route, he reached the Portuguese settlement of Benguela, on the west coast, in October, 1875, whence he returned to England. An account of his travels, which contains a vast number of valuable scientific observations, was published in 1877 in two vols., under the title of "Across Africa." C. was a Companion of the Bath, and raised to the naval rank of Commander.

CAMERON HIGHLANDERS (the Queen's Own Cameron Highlanders), the designation given to the 79th Regiment of infantry in the British service, in consequence of the corps having been raised by Allan Cameron of Erroch in 1793. Originally, it consisted of 1000 men, but a second battalion was added in 1804. This gallant regiment, which wears the Highland garb, performed distinguished services in the Peninsula and at Waterloo, and in the chief warlike struggles of more recent times.

CAMERO'NIAN REGIMENT, the 26th Regiment of infantry in the British service, so called from having had its origin in a body of Cameronians (q. v.) during the Revolution of 1688. Taking advantage of their zeal and courage, the Convention which sat at Edinburgh induced a number of them to assist in the Revolution, which it was imagined by some was to re-establish the reign of the Covenants. They were induced to enlist on the understanding that the special object of the corps was "to recover and establish the work of Reformation in Scotland, in opposition to popery, prelacy, and arbitrary power, in all the branches and steps thereof, till the government in church and state be brought to that lustre and integrity which it had in the best of times." (See Burton's "History of Scotland," vol. i. p. 49.) Thus was formed the celebrated C. R., with the youthful Lord Angus as colonel, and William Cleland as lieutenant-colonel and actual commander. Under Cleland, not yet in his 30th year, the regiment was sent northwards to quell the insurrection, after the fall of Viscount Dundee. Surrounded by from 4000 to 5000 Highlanders, the Cameronians, only 800 strong, gallantly defended themselves during a whole day in Dunkeld, August 21, 1689. In this terrific struggle, the brave Cleland was killed. Considering the issue of the Revolution, they had been entrapped into military service, and their employment on foreign service afterwards greatly scandalised the Cameronian sect. The regiment has ever done credit to its origin; being distinguished alike for gallantry and for good conduct.

CAMERO'NIANS, the religious sect in Scotland popularly named after Richard Cameron (q. v.). Its official designation, however, is that of Reformed Presbyterians. No doubt, the principles of the body are those for which Cameron contended and died; but not till after 1688 did the small body of Presbyterians, who insisted upon the restoration of the civil and ecclesiastical polity of 1638 to 1649 in

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opposition to the Revolution settlement, assume a distinct form. According to the Solemn League and Covenant, ratified by the parliaments of England and Scotland, and also by the Assembly of Divines at Westminster in 1643, Presbyterianism was to be maintained in the kingdoms of England, Scotland, and Ireland, and popery, prelacy, superstition, heresy, schism, &c., were to be extirpated. As a measure of pacification, Presbyterianism was established in Scotland by an act of parliament, 1690; but it was of a modified kind, rendering the church a creature of the state, more particularly as regards the calling of General Assemblies. Equally to the disgust of the extreme party referred to, prelacy was confirmed in England and Ireland, and there was a general toleration of heresy—i. e., dissent. In sentiment, if not in form, therefore, this party repudiated the government of William III. and his successors, and maintained the perpetually binding obligations of the Covenants. Unquestionably, these C. acted under strong convictions, and only desired to carry out to a legitimate issue theoretical principles of the Church of Scotland, which, for prudential considerations, have been practically in abeyance; and it is in the standards of this sect that we find a true embodiment of the tenets held by the great body of English and Scotch Presbyterians of 1643. Although thus an elder sister of the existing Church of Scotland and all its Secessions, it was with some difficulty that, after the Revolution, if organised a communion with ordained ministers. The steadfastness of members was put to a severe trial by the defection of their ministers; but in 1706, after their faith and patience had been tried for 16 years, they were joined by the Rev. John M'Millan, from the Established Church; and shortly afterwards by the Rev. John M'Neil, a licentiate of the same Church. To confirm the faith of members, and give a public testimony of their principles, the covenants were solemnly renewed on Auchensauch Hill, near Douglas, in Lanarkshire, in 1712. The subsequent accession of the Rev. Mr Nairne enabled the C. to constitute a presbytery at Braehead, in the parish of Carnwath, on the 1st of August 1743, under the appellation of the Reformed Presbytery. Other preachers afterwards attached themselves to the sect, which continued to flourish obscurely in the west of Scotland and north of Ireland. For their history and tenets, we refer to the "Testimony of the Reformed Presbyterian Church" (Glasgow, John Keith, 1842). Holding strictly to the Covenants, and in theory rejecting the Revolution settlement, the political position of the C. is very peculiar, as they refuse to recognise any laws or institutions which they conceive to be inimical to those of the kingdom of Christ; from which cause many of them formerly isolated themselves from general society, and refused several of the responsibilities and privileges of citizens. In 1860, there was an attempt on the part of some of the kirk-sessions to prevent the members becoming volunteers, on account of the oath of allegiance which required to be taken. On the question coming before the synod, it was decided (1863) that excommunication for taking the oath should cease. In consequence of this decision, 10 or 12 congregations seceded. In 1876, the larger body of the Reformed Presbyterians, consisting of about 45 congregations, was formally united to the Free Church of Scotland, so that the distinctive features of the Cameronians are now represented by the few congregations which seceded in 1863.

CAMEROO'NS, a river of Upper Guinea, Africa, which enters the Bight of Biafra from a north-east direction, in about lat. 4° n., long. 9° 40′ e., by an estuary some 20 miles in breadth. Its length is not certainly known, but for 40 miles upwards its breadth averages nearly a quarter of a mile, its depth varying in the dry season from 2 to 20 feet. The left bank of the river is steep and high, the right for many miles low and swampy, and covered with mangroves. There are several populous and thriving villages on its banks, whose inhabitants carry on an extensive trade in palm-oil, and ivory, obtained in great quantities from dead elephants, which have perished in search of water in a great morass island.—C. is also the name of a cape one of the islands of the estuary.—C. PEAK is the name of the culminating point in the C. Mountains, which in lat. 4° 18′ n., and long 9° 10′ e., has an elevation estimated at 13,000 feet.

CAME'TA, a town of Brazil, on the Tocantins, which joins the estuary of the Amazon from the south. It has a fertile district attached to it, which is estimated to contain 20,000 inhabitants.

CAMILLUS, Marcus Furius, a celebrated Roman patrician who first makes his

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appearance as consular tribune, 403 B.C. His military career was a series of unbroken successes, according to the accounts which have come down to us; but these accounts have been shewn by Niebuhr to possess a considerable admixture of mythological or poetic fiction. In 396, C. was made dictator, during the Veientine war, in which he mined and captured the city of Veii; but the proud splendor of his subsequent triumph offended the Roman populace, who were still further displeased when C. demanded a tithe of the spoils of Veii, in order to fulfil a vow made to Apollo, on condition of victory. In 394, C. was again elected consular tribune, and besieged the Faleril, who after bravely defending themselves, were led by a magnanimous act of C. to yield unconditionally. Afterwards, C., being accused of peculation, and foreseeing certain condemnation, banished himself from Rome, 391, and lived in retirement at Ardea, until Brennus, at the head of his wild Gauls, had swept through Etruria, and captured and destroyed the whole of Rome except the Capitol. C. was now recalled, and appointed dictator a second time. He achieved a decisive victory over the invaders, rebuilt Rome, and obtained new victories over the Volsci, and others. In 386 B.C., he was elected dictator for the third time, but refused the office. In 381 B.C., C. was victorious in the war of Rome against Præneste and other Latin towns; and in 368 B.C., he was elected to his fourth dictatorship, but abdicated during the same year. In 367 B.C., when war broke out with the Gauls, C., though 80 years old, accepted the dictatorship for the fifth time, defeated the barbarians near Alba, and made peace between patricians and plebeians. After this, he erected near the Capitol a temple to Concord, and, having retired from public life, died 365 B.C., of the plague, lamented by the whole Roman people.

CAMISARDS. See CEVENNES.

CA'MLET (from Arab. *chamal*, fine) is properly a fabric made from the hair of the Angora-goat (q. v.). The camlets made in Britain are either wholly of wool, or of wool mixed with cotton or linen, and spun hard.

CAMOENS, Luis de, the epic poet of Portugal, was born about 1524, at Lisbon, and studied the ancient classics at Coimbra. On his return to Lisbon, he fell in love with a lady of honor, Catharina d'Atayada. This affair was the beginning of all the poet's misfortunes. Having been banished by royal authority to Santarem, C. joined the expedition of John III. against Marocco, and lost his right eye in a naval engagement with the Moors in the Strait of Gibraltar. On his return to Lisbon, his bravery as a soldier was no more honored than his genius as a poet. Disappointed in all his hopes, he determined to leave for ever his native land, and sailed for India, 1553. Offended by certain abuses of the Portuguese authorities in India, C. ventured to expose them in a satire, entitled "Disparates na India," "Folies in India," in which he treated even the viceroy with ridicule. For this offence, the poet was banished, 1556, to Macao, where he lived several years, and was engaged in writing "Os Lusiadas." Here C. held the unpoetical but probably lucrative post of administrator of the effects of deceased persons; and having saved, as he thought, a competency for his future life, was recalled from his banishment, 1561. Unhappily, in returning to Goa, he suffered shipwreck, and lost all his property, excepting his epic poem. After other wanderings and misfortunes, C. took ship for Lisbon, where he arrived in 1569, with no other wealth but his epic. He dedicated "The Lusiad" to the young king, Sabastian, who was very gracious; but, nevertheless, all the real patronage bestowed on C. consisted of a very small pension (about £4), and permission to remain at the court of Lisbon. Even this small pittance was taken away after the death of Sebastian, and C. was left in such poverty, that a faithful Indian servant begged in the streets of Lisbon for the support of the great epic poet of Portugal. C.'s lyric poems, written during this time of destitution, contain many pathetic lamentations. He died obscurely in the hospital at Lisbon, 1579; and sixteen years afterwards, when it was proposed to erect a splendid monument to his memory, there was some difficulty in finding his burial-place.

"The Lusiad" (*Os Lusiadas*, "the Lusitanians") celebrates the chief events in the history of Portugal, and is remarkable as the only modern epic poem which is pervaded by anything like the true national and popular spirit of ancient epic poems. It is a gallery of epic pictures, in which all the great achievements of Portuguese heroism are represented. Among the most famous passages are the tragi-

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cal story of Inez de Castro, and the apparition of the giant Adamastor, who appears as the Spirit of the Storm to Vasco da Gama, when crossing the Cape. The versification of "The Lusiad" is extremely charming. Patriotic sentiments pervade the whole work. Besides his epic poems, C. wrote sonnets, odes, elegies, eclogues, epigrams, satires, epistles, and three comedies—"Os Amphitryoes" (after Plautus), "King Seleucus," and "Filodemo." The latest and best complete editions of his poems appeared in three volumes (Hamburg, 1834). The best edition of "The Lusiad" was published in Paris (1817), reprinted in 1819, and again, with emendations by Berdier, in 1823. "The Lusiad" has been translated into Spanish, French, Italian, English, Polish, and German.

CAMO'GLIA, a town of n. Italy, on the Gulf of Genoa, about 18 m. e.s.e. of the city of that name. Its inhabitants, amounting in 1872 to 6345, are chiefly engaged in fishing.

CA'MOMILE. See CHAMOMILE.

CAMO'RRA, the name of a secret society, existing throughout all parts of the former kingdom of Naples, the members of which are called *Camorristi*, and have exercised lawless force to a great extent over the humbler classes of society. Under the Bourbons, they openly presented themselves at markets, hackney-coach stations, public spectacles, and all occasions of popular amusement; assumed the right of deciding disputes; extorted a portion of whatever money passed from hand to hand for purchases, rents, wages, and the like, or in games; undertook also the transport of smuggled goods, and contracted for the commission of serious crimes. Their readiness for violence and murder, and their close association among themselves, made them so much dreaded, that even Camorristi, who had been thrown into prison, succeeded in exacting money from their fellow-prisoners, and from the jailer himself. The society has a central rendezvous in every large provincial town, and twelve such in the city of Naples. Those who belong to each of these sections of the society are under the absolute government of a chief elected by themselves, with whom is associated a treasurer. The latter has the charge of the common fund into which all the Camorristi of that section pay their whole gains, for equal distribution among all their associates. Candidates for membership must shew that they have neither been guilty of espionage nor theft; also that neither their wives nor their sisters are prostitutes; and must swear upon an iron crucifix a fearful oath of fidelity and secrecy. The candidate remains for a year, with the designation of *Picciotto d'onore*, as a pupil under an old Camorrista; and having completed this probation, and given proof of his courage and obedience in circumstances involving danger of life, he is advanced to the rank of a *Picciotto di sgarro*. Finally, after a longer period, and when he has given proof of his fitness on a number of occasions, he is admitted to full membership of the society as a *Camorrista*. Each Camorrista carries about with him two knives of a peculiar form, by which the members of the society recognise each other. They are held under the strictest discipline. Disobedience is punished by flogging, suspension from employment, or expulsion; treachery, even on the part of a member who has been expelled, is punished with death. If two Camorristi quarrel, their chief decides the question between them; but in difficult cases, a duel with daggers is the mode of decision. Under King Ferdinand II. the Camorra was tolerated for political reasons. The government of Francis II. endeavored to put down the society, and the police received instructions to seize and transport all known members of it. Those who remained entered into alliance with the Garibaldi committee, and rendered essential service in the expulsion of the Bourbons. An attempt was now made to employ them in the police service, but completely failed. The Camorra having fallen out with the new government, the members of the society now chiefly live by robbery in South Italy.—See Monnier, "La Camorra, Notizie Storiche" (Flor. 1863).

CA'MOUFLET, in military Pyrotechny, is a stinking composition enclosed in paper-cases. It is used in siege-works, to blow into the faces of the sappers and miners, when hostile parties come within reach of each other, and thus to confuse them.

CAMP (Fr., from Lat. *campus*, a plain, or level field). The signification of this

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word in English is rather that which belongs to the Latin *castrum*, an encampment, or *castra*, a collection of tents, huts, and other structures, for the accommodation and protection of troops, than that which its etymology would more directly indicate. The regular system of encampment ultimately adopted by the Romans, was forced upon them by degrees. The most complete account of it is furnished to us by Polybius. A plan will be found in Dr Smith's "Dictionary of Greek and Roman Antiquities," constructed for the purpose of illustrating his description. When a Roman army was about to encamp, a tribune and several centurions were sent on before, to select a suitable site for the purpose. As soon as the locality was determined on, they chose the spot for the prætorium or general's tent, and marked it with a white flag. Around the prætorium, as a sort of centre or heart to the whole system, the rest of the C. was laid out. It was generally placed on an elevated position, in order that the general might have the rest of the encampment under his eye, and be able to transmit his orders with greater facility. Polybius himself tells us, that the best conception which can be formed of a Roman C. of the more permanent kind is by regarding it as a military town, resembling in many respects no doubt that which has recently grown up at Aldershot (q. v.). The streets were broader than those usually to be found in towns, the wider ones measuring 100, and the narrower 50 feet; and the *forum*, as it name indicates, was a sort of public market-place. A space of 200 feet was left vacant all round between the tents and the ramparts, partly to afford space for the arrangements of the army, and for stowing away any booty that might be captured, but chiefly to protect the soldiers' huts from incendiary attempts from without. In form, the Roman C. was square, except in the case in which it was intended to embrace within its ramparts four legions, or two consular armies, when it became an oblong rectangle. The C. was surrounded by a fosse or trench (*fossa*), which was generally 9 feet deep and 12 broad. On the top of the rampart, which was of earth, there were stakes. The labor of constructing the rampart and the fosse was divided between the allies and the Roman legions, the former making the sides along which they were stationed, and the legions the rest. The task of superintending the construction of the C. amongst the Romans was intrusted to the tribunes: amongst the allies, to the præfects. Before the arrival of the troops, the different parts of the C. were so distinctly marked out and measured off, that they at once proceeded to their respective stations, as if they had entered a well-known city, and were marching to their quarters. The discipline of the C. was of the strictest kind. The tribunes administered an oath against theft both to freemen and slaves, and two maniples were chosen to keep the *via principalis*, which was a place of general resort, clean and in good repair. The other occupations connected with the C., too numerous to be mentioned here, were portioned out in like manner; and the superintendence of the whole was intrusted to two tribunes chosen by lot from each legion, and appointed to serve for two months. The præfects of the allies possessed a similar authority, which, however, seems to have been limited to their own troops. Every morning at daybreak, the centurions and horsemen presented themselves to the tribunes, and these, in their turn, received their orders from the consul. The watchword for the night, marked on a four-cornered piece of wood, was given out with much formality. The night was divided into four watches, each of three hours' length; and there was a curious arrangement for ascertaining that guard was kept with vigilance. The soldiers of the watch companies received from the tribune a number of small tablets, with certain marks upon them, and these tablets were collected during the night by the horsemen whose duty it was to visit the posts, from such of the guards as they found on duty. Where these inspectors found the guards asleep or absent, they called upon the bystanders to witness the fact, and then passed on to the next. In the morning, the inspectors appeared before the tribunes, and gave up the tablets they had received, when the guards whose tablets were not produced were required to account for them. A regular scale of rewards and punishments was established in the camp. In comparing the encampments of the Romans with those of his own countrymen, Polybius tells us that the Greeks trusted mainly to a judicious selection of their ground, and regarded the natural advantages which they thus secured as supplying in a great measure the place of artificial means of defence. The Greeks, consequently, had no regular form of C., and no fixed places were assigned to the dif-

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ferent divisions of the army. When the practice of drawing up the army according to cohorts, introduced by Marius and Cæsar, was adopted, the internal arrangements of the C. experienced a corresponding change. Latterly, even the square form was abandoned, and the C. was made to suit the nature of the ground. It was always held to be of importance, however, that the C. occupied a defensible position; that it could not be overlooked; and that it had a command of water.

When stationary camps (*castra stativa*) came into more general use, we hear of several parts which are not mentioned by Polybius, for example, the infirmary (*valetudinarium*), the farriery (*veterinarium*), the forge (*fabrica*), &c.; and as a great variety of troops then came to be employed, they must, of course, have had new stations appointed to them in the camp. Many of the stationary camps ultimately became towns, and to this is ascribed the origin of most of the towns in England the names of which end in *ceester* or *chester*. Amongst the most perfect of those which retained the form of the simple encampment, is that at Ardoch in Strathearn, Perthshire, in the grass-covered mounds and ridges of which most of the divisions of the C. have been distinctly traced by antiquaries. For further information on this subject, the reader is referred to General Roy's "Military Antiquities in Great Britain," and the "Caledonia Romana" of the late Mr Robert Stuart. In these works will be found ample accounts of some of the more remarkable Roman camps in Britain; those described by Roy being rendered intelligible by large engravings.

It is believed that, during the middle ages, the plan adopted by the Romans in their camps was more or less adhered to, seeing that the weapons employed, which mainly determined the character of the troops, were nearly the same. In Britain, before the arrival of the Romans, and also during the Saxon and Danish periods, the camps, usually circular in form, appear to have been somewhat rude in character, with the cavalry grouped round the standard in the centre, and the infantry placed near the front.

The principles of castrametation, or camp-formation, underwent much change after the invention of gunpowder, owing to the necessity for defending the C. from artillery. Modern camps of different kinds, will be found described under ENCAMPMENT.

CAMP EQUIPAGE is a general name for all the tents, furniture, fittings and utensils carried with an army, applicable to the domestic rather than the warlike wants of the soldier. In the days when armor was worn, the C. E. was enormously heavy and complicated. In the present day a certain amount of C. E. is provided for a given number of troops. See ENCAMPMENT, TENT, &c.

CAMP FOLLOWERS are the sutlers and dealers in small wares who follow an army. In India, owing to the peculiar habits and customs of the Hindus, and the large number of servants retained by English officers, the C. F. are in immense numbers: comprising servants, sutlers, cantiniers, hostlers, water-carriers, snake-charmers, dancers, conjurors, and women. In February, 1839, when a Bengal army of 15,000 men left Shikarpoor for Afghanistan, it was accompanied by no fewer than 85,000 C. F.: the commander took with him six week's food for the whole 100,000. All English commanders in India find this regulation a very burdensome one. Even in European armies, however, C. F. are regarded as necessary; they are under the control of the commanding officer, and are subject to the Articles of War—not, however, in cantonments, only in the field. French armies are accompanied by women much more largely than English.

CAMPA'GNA, a town of Italy, in the province of Salerno, is situated between high mountains, about 20 miles east of Salerno. It has a fine cathedral, several convents, and a large annual fair. Pop. (1872) 9313.

CAMPAGNA DI ROMA, an undulating, uncultivated, and unhealthy plain of Italy surrounding Rome, including the greatest part of ancient *Latium*, and forming the late papal delegation of Frosinone and a great part of the Comarca di Roma. Its length is variously stated, arising from the fact that different authorities measure it from different points. But supposing the name to apply to the district extending from Cape Linaro, south of Civita Vecchia, to Terracina, beyond the Pontine Marshes, its length is about 90 miles; and its breadth inland, to the Alban and Sabine hills, is stated at from 27 to 40 miles. A broad strip of sandy plain skirts the Mediterranean. The ground, which never rises above 200 feet above the sea, is

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almost entirely volcanic, and the lakes are formed by craters of extinct volcanoes. The vapors rising from this district, and especially from the Solfatara (q. v.), produce the pestilential atmosphere styled *Aria Cattiva*. The number of inhabitants is very small, and in summer they are driven from the C. by its pestilent air, and seek shelter in Rome and other neighboring places. In autumn, herdsmen descend from the Apennines to the C. with their herds, the pasturage in some parts being rich and abundant. This district was not always uncultivated and depopulated as we now find it, for Domitian and Hadrian built here their splendid villas. Wars and devastations, the "black death" (q. v.) in the 14th c., which greatly thinned the population, and inundations from the Tiber, have been the main causes of the present state of the C.; but, according to Livy, it was always an unhealthy district, even when well cultivated. Some of the popes, especially Pius VI., have endeavored to drain the Pontine Marshes, and, during the dominion of the French in Italy, General Miollis made great improvements in drainage, timber-planting, and cultivation in the Campagna.

CAMPAI'GN generally means a connected series of military operations, forming a distinct stage or step in a war. Under the old system of warfare, when armies kept the field only during the summer months, a C. was understood to include all that was done by an army from the time it took the field till it went again into winter-quarters. Now that winter is no longer allowed to arrest military operations, it is more difficult to say where one C. ends and another begins. Some writers make a C. include all the steps taken to accomplish some one immediate object.

CAMPAN, Jeanne Louise Henriette, reader to the daughters of Louis XV., was born in Paris, October 6, 1752. She was favored by Marie Antoinette, and gave her royal patroness numerous proofs of her fidelity. When the unfortunate queen was conveyed to the Temple, she wished to share her captivity, but was refused entrance by Petion. During the Reign of Terror, she remained concealed at Combertin. After the fall of Robespierre, she opened a boarding-school at St Germaine-en-Laye, which was patronised by Josephine Beauharnais, who sent her daughter Hortense to it. In 1806, Napoleon appointed her lady-superintendent of the Institution at Econen for the education of the daughters of the officers of the Legion of Honor. After the Restoration, this institution was suppressed, and Madame C. retired to Mantes, where she died May 16, 1822. She is chiefly remembered on account of her interesting works—"Mémoires sur la Vie Privée de la Reine Marie Antoinette" (4 vols., 5th ed., Par. 1824), "Journal Anecdotique" (Par. 1824), and "Correspondance Inédite avec la Reine Hortense" (2 vols., Par. 1835)—giving recollections of the court of Louis XV., of Marie Antoinette, the Revolution, and some traits from the private character of Napoleon.

CAMPA'NA, La, a town of Andalusia, Spain, situated on the Madre-Viega, a tributory of the Guadalquiver, about 37 miles east-north-east of Seville. The inhabitants, numbering 5880, are engaged chiefly in agricultural pursuits, and in weaving and brick-making.

CAMPANA'RIO, a town of Estremadura, Spain, about 62 miles east-south-east of Badajos. It is an ill-built place, with narrow, uncared-for streets. It has manufactures of linens and ropes, and a trade in the agricultural produce of the neighborhood. Pop. 5400.

CAMPANELLA, Tomma'so, a Dominican monk celebrated for his philosophical ability, was born in 1568 at Stilo in Calabria, and studied at Naples and Cosenza. The writings of Telesius first awakened his doubts respecting that pile of artificial dogmas styled the "scholastic philosophy." The results of his studies were given in his "Philosophia Sensibus Demonstrata," &c., (Naples, 1591), which contained a defence of Telesius. His superiority in disputations exposed him to the hatred and false accusations of the orthodox monks and schoolmen. He was in consequence compelled to flee from Naples to Rome, and thence to Florence, Venice, and Bologna. Afterwards, he returned to Calabria, but having involved himself in a political conspiracy, he was seized and confined in a Neapolitan dungeon for 27 years; tried five times, and tortured seven; accused of heresy; and declared the author of a book which had been published thirty years before he was born. In 1626, Pope Urban VIII. had him brought to the prison of the Inquisition at Rome, but immediately liberated him, and treated him in a very generous manner. After being

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again persecuted by the Spanish government, C., who had formed the friendship of the French ambassador at Rome, the Duc de Noailles, obtained a letter of introduction to Cardinal Richelieu, and secretly left for France, where he was graciously received. He died in the Dominican monastery of St Honoré, near Paris, 1639. Most of his works—"De Gentilismo non Retinendo" (Paris, 1636), "Astrologicorum Libri VII." (Lyon, 1629), "Prodromus Philosophiæ Instaurandæ" (Frankfort, 1617), "Exordium Metaphysicæ Novæ," "De Sensu Rerum et Magia" (Frankfort, 1620)—were written during his imprisonment. His philosophical views give expression to that confused fermentation of new ideas which was characteristic of the close of the 16th and opening of the 17th c.—bold and clear opinions strangely mingled with commonplaces and with astrological dreams and fancies. It may seem strange that C. should have been patronised by the pope; but this favor was gained, not by his speculative works, but by several writings in defence of the Roman Catholic Church. His "De Monarchia Hispanica Discursus" is a work of great power and value, comprising a sketch of the political world of C.'s time, with special reference to Spain. It was translated into English during Cromwell's Protectorate.

• CAMPA'NHA, a town of Brazil, about 150 miles north-west of Rio de Janeiro, surrounded by bare hills, much cut up by gold mines. The houses are built chiefly of earth, and surrounded by gardens. C. has several churches, a Latin school, an hospital, theatre, &c. Pop. 6000.

CAMPA'NIA, anciently a province of Central Italy, having Capua as its capital (now subdivided into the provinces of Benevento, Naples, Salerno, Avellino, and Caserta), was bounded on the s. by Lucania, e. by Samnium, n. by Latium, and w. by the Tyrrhenian Sea. It was one of the most productive plains in the world, producing in extraordinary abundance corn, wine, and oil; and both by Greek and Roman writers is celebrated for its soft and genial climate, its landscapes, and its harbors. It was the *regio felix* of the Romans, who built here many of their most splendid villas, &c. Through it passed the Appian Way, the greatest high-road of Italy. The promontory Misenum, Mount Vesuvius, the river Vulturnus, the towns Baiæ, Cumæ, Linternum, Puteoli, Naples, Herculaneum, Pompeii, Nola, Salernum, Capua, &c., belonged to Campania. It was the oldest Greek settlement in Italy, having been colonised, according to the later chronologers, about 1050 B. C.; but this is in all probability too early a date. It was next conquered by the Etruscans, and several of the towns above mentioned, such as Capua and Nola, were founded by that people. The Etruscans then succumbed to the more warlike and hardy Samnites, who, in their turn, yielded to the irresistible valor of Rome (340 B. C.). Through all these vicissitudes of conquest, the substratum of the people remained as at the beginning. The mass of the Campanians were essentially of Oscan race, and Oscan they remained. Indeed, it is mainly from them that our knowledge of the Oscan language is derived, and one of their towns—Atella, between Capua and Naples—had the honor of introducing upon the early Roman stage a species of popular drama or comedy, which was greatly relished for its quaint and vigorous humor. See ATELLANÆ.

CA'MPANILE (Ital., from Mid. Lat. *campana*, a bell), a name adopted from the Italian to signify a bell-tower of the larger kind, and usually applied only to such as are detached from the church. Scarcely any of the existing bell-towers of England answer to the Italian conception of the C., but it is said that there was a very fine one at Salisbury, 200 feet in height, which was destroyed by Wyatt. In Italy, they are found everywhere—at Bologna, Padua, Ravenna, Cremona, Venice. Perhaps the most remarkable are the so-called "leaning tower" of Pisa, and the C. of Florence. The former, which is circular in form, is decorated with columns and arcades to the summit of its eight stories, and presents a very imposing appearance, reminding the traveller of the Coliseum at Rome, from which, and the now destroyed Septizonium, the idea of it is said to have been taken by the architects Bonano of Pisa, and Wilhelm of Innspruck. But though less curious, the famous C. of Giotto is perhaps even more worthy of the traveller's attention. It was erected in 1334, with the express object of surpassing, both in height and in richness of workmanship, any of the remains of antiquity. In form, it is a parallelopiped, and is of the same dimensions from bottom to top. Though it is very lofty—267 feet—it consists of only four stories, of which the tallest are the uppermost and undermost; and the

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windows in the upper story are rather larger than those in the two beneath, the object being to counteract the diminution to the eye occasioned by the greater distance. The effect of this arrangement has been much praised by architects; but there seems ground for scepticism as to its advantages. The style is the real Italian Gothic, which unites simplicity with great richness of ornamentation. The original design of Giotto was that a spire of 100 braccia in height should have surmounted the present structure, and on the summit may be seen the four great piers from which it was intended that it should have risen. The splendid C. of Florence, in its present condition, must thus be regarded only as a fragment. There is a fine C. at Seville, 350 feet in height, which was built by Guever the Moor in 1568. It is called La Giralda, from a brazen figure, which, though it weighs a ton and a half, turns with the wind.

CAMPA'NULA (Lat., a little bell), a genus of plants of the natural order *Campanulaceæ* (q. v.), distinguished by a bell-shaped corolla with five broad short segments, filaments dilated at the base, a 2—5-cleft stigma, and a top-shaped capsule with 2—5 cells, opening by lateral clefts below the calyx segments. The species are very numerous, chiefly but not exclusively abounding in the northern parts of the world, and the more elevated districts of the temperate zones. They are mostly herbaceous, some of them annual. The name BELL-FLOWER is common to many of them, and is often extended to all. The flowers are in general beautiful, and many of the species are therefore frequent ornaments of flower-borders. Of the native British species, the most common, and one of the most beautiful, is the HAREBELL (q. v.) or BLUEBELL (*C. rotundifolia*). The CANTERBURY BELL (*C. Medium*) is a very beautiful annual, which has long been so generally sown in flower-borders in Britain, that it is almost as familiar to every one as the most common field-flowers. It is a native of the central parts of Europe.—Medicinal virtues were formerly ascribed to some species, particularly in affections of the throat, wherefore *C. Trachelium*, frequent in woods in England, has received the name of Throatwort; but they are now regarded as inert.—The roots of some are reckoned among esculents, as those of the RAMPION (q. v.), (*C. Rapunculus*), occasionally cultivated in Britain, and much more generally in some parts of continental Europe.

CAMPANULA'CEÆ, a natural order of exogenous plants, herbaceous or half shrubby, with a bitter milky juice; leaves without stipules, and generally alternate; the calyx usually 5-lobed, its tube adhering to the ovary; the corolla monopetalous, inserted into the top of the calyx, usually 5-lobed and regular; the stamens inserted into the calyx, and alternate with the lobes of the corolla; the fruit with two or more many-seeded cells, crowned with the withered calyx and corolla, and opening by division of the cells (*loculicidally*); the seeds fixed to the axis, and having fleshy albumen. About 500 species are known, natives chiefly of the temperate and colder climates of the northern hemisphere, where their blue or white flowers are among the finest ornaments of fields and woods. The roots and young leaves of some species are eatable, as is the half-fleshy fruit of *Canarina Campanula*, a native of the Canary Islands.

CA'MPBELL, the family name of the Lords of Argyle. The origin of the family has not been satisfactorily ascertained. One theory makes it of Anglo-Norman origin; another traces its descent through a long line of Celtic chiefs to King Arthur. It first appears in record towards the end of the 13th c., when it held lands in Ayrshire and Argyle. The chiefs of the family having taking a prominent part in public affairs, the most distinguished are noticed under the head ARGYLE.

CAMPBELL, Sir Colin, Lord Clyde, one of the bravest soldiers and most distinguished generals of modern times, was born in Glasgow, in 1792. His father was a cabinet-maker, named John Macliver, but Colin assumed the name of Campbell, to gratify an uncle on the mother's side. He entered the army as an ensign in 1808; fought through the war in the Spanish peninsula with distinction, and took part in the expedition to the United States in 1814. In 1842, he attained the rank of colonel and in the same year he was present at the attack on Chusan, in China, and for his services there received honorable mention in the "Gazette." He next served in the Punjab, commanding the left at the battle of Chillianwallah. For his conduct in

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this battle, Lord Gough awarded him the highest praise in his dispatch to the governor-general of India. He next commanded in the Peshawur district with uniform success against the hill-tribes. On the breaking out of the Crimean war in 1854, he was appointed to the command of the Highland Brigade, and took a prominent part at the battle of the Alma; and afterwards at Balaklava, where, with the 93d Highlanders, which he did not even form into square, he beat back the Russian cavalry, who were swooping down on the port, with its accumulation of shipping and stores. His services in this war were rewarded with promotion to the rank of major-general, and he was also created a Knight Grand Cross of the Order of the Bath, and received the Cross of the French Legion of Honor. He was appointed Inspector-general of Infantry, and in 1857, commander of the forces in India, then engaged in quelling the Indian mutiny, which by his energy and judgement was soon utterly subdued. One of the most notable characteristics of C.'s generalship, was the care he took of the lives of his men, all his victories being won with the minimum expenditure of the blood of his soldiers. For his exploits in India, C., in 1858, was created a peer of the realm, with the title of Baron Clyde, and appointed a general, the East India Company granting him an annuity of £2000. C. arrived in Britain from India in 1860, and died August 1863.

CAMPBELL, George, D.D., an eminent theological writer, was born at Aberdeen in 1719. He was educated for the law, but abandoned that profession for the study of divinity. In 1746, he was ordained minister of Banchory Ternan, a parish lying some miles south-west of Aberdeen; and in 1759, he was appointed Principal of Marischal College. His first work was his famous "Treatise on Miracles," in answer to Hume. The dispute concerning miracles has assumed a new form in the present century, and C.'s arguments would not meet all the objections which the modern school of rationalists urge; but the work in its own day was greatly admired, and characterised as "one of the most acute and convincing treatises that has ever appeared on the subject." It was speedily translated into French, Dutch, and German. In 1771, C. was elected Professor of Divinity in Marischal College. In 1776, he published his "Philosophy of Rhetoric," which is still a standard work on the subject. His last work was a "Translation of the Gospels, with Preliminary Dissertations and Notes." He died April 6, 1796. After his death appeared his "Lectures on Ecclesiastical History."

CAMPBELL, John (Campbell), Lord, High Chancellor of England, son of a minister of Cupar, in the county of Fife, Scotland, was born in 1779. He was at first destined to follow his father's profession, and was sent, while still a mere boy, to the neighboring university of St Andrews. C. himself had no inclination for a clerical life, and when he had completed his studies in the Faculty of Arts, he left for London, being then about 19 years of age. He obtained employment on the staff of the "Morning Chronicle," where, in due time, he was intrusted with the care of the theatrical criticism and the reports in the House of Commons. He was called to the bar in 1806. His sound sense, and unpretending activity and devotion to business, were awarded with an extensive common-law practice, and, after a time, with professional promotion. The silk gown of a king's counsel was conferred upon him in 1827. Three years afterwards, he entered parliament, actuated, he tells us in the preface to one of his works, by a desire to obtain for England the benefits of a national registry of titles to land. The effort, at the time, was unavailing, as the landlords, whom it was destined more immediately to benefit, completely misunderstood the purport of the project. C. was promoted by the Whig party, to which he had attached himself, to the Solicitor-generalship in 1832, and to the Attorney-generalship in 1834. In the same year, he was chosen the representative in parliament for Edinburgh. He continued to represent Edinburgh down to 1841, and remained in the office of Attorney-general during that period, with the exception of the short time in 1835, when the Conservatives were in power. In 1841, he was made Chancellor of Ireland, and a peer of the United Kingdom; but held the office of Chancellor for only a few months, when the Melbourne cabinet left office, necessitating C. also to resign. For the first time since boyhood, he found himself without regular daily labor, and at the mature age of 60, set to work to win the literary fame which he professes always to have secretly coveted. His first publication was a collection of his speeches

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at the bar and in the House of Commons. For three or four years after the publication of his speeches, C. was engaged in the preparation of the "Lives of the Chancellors," the first series of which appeared in 1845. In 1846, he joined the Russell cabinet in the capacity of Chancellor of the Duchy of Lancaster. His ministerial duties were not sufficiently arduous to interrupt his literary labors, and he proceeded to complete the "Lives of the Chancellors," and to publish a supplemental series of "Lives of the Chief-justices of England." Both works have enjoyed great popularity, but leave no doubt that the author was more fitted for a practical lawyer than for a man of letters. C. returned to more congenial labors in 1850; he was then appointed to succeed Denman as Chief-justice. He held the office for nine years, at the end of which he received the highest honor that can be obtained by a member of the legal profession—the Chancellorship of England. He died June 1861.

CAMPBELL, Thomas, a distinguished English poet, was born in the city of Glasgow, 27th July, 1777. His father was a merchant, and the poet was the youngest of ten children. He was sent to the university of his native city, and remained there six years. During his collegiate course, he received several prizes, and was particularly distinguished for his knowledge of Greek literature. On leaving the university, C. went to reside as a tutor for a year in the island of Mull. The scenery of the West Highlands made a deep impression on his mind, and to his abode in these grand and desolate regions we are indebted for many of the touches of sublimity which occur in his verses. Returning from Argyleshire, C. meditated the study of law, and repaired to Edinburgh; but he could not shake off his recollections. In his eyes, the mists were folded on the hills of Morven, the roar of Corrievrekin was in his ears, and instead of prosecuting the study of jurisprudence, he wrote "The Pleasures of Hope." The poem was published in 1799, and went through four editions in a twelvemonth. After its publication, C. went to the continent; and on December 3, 1800, witnessed from a Bavarian monastery the battle of Hohenlinden, fought between the French and Austrians. In 1801, he returned to England, with "The Exile of Erin" and "Ye Mariners of England" in his portmanteau; and shortly after, took up his abode in Edinburgh, where "Lochiel's Warning" was composed. In 1803, C. proceeded to London, and adopted literature as a profession. He contributed articles to "The Edinburgh Encyclopædia," and compiled "The Annals of Great Britain from the Accession of George II. to the Peace of Amiens," in 3 vols. In 1806, through the influence of Mr Fox, C. received a pension of £200 per annum from government. In 1809, he published "Gertrude of Wyoming," which bears the same relation to "The Pleasures of Hope" that "The Castle of Indolence" bears to "The Seasons"—a less brilliant and striking, but more mature and finished performance. In 1818, C. was again in Germany, and on his return, he published his "Specimens of the British Poets," in 7 vols. In 1820, he delivered a course of lectures on poetry at the Surrey Institution. From this date to 1830, C. edited "The New Monthly Magazine," and contributed thereto several poems, one of which, "The Last Man," is in some respects the loftiest of all his performances. In 1824, he published "Theodoric and other Poems." In 1827, he was elected Lord Rector of the university of Glasgow, and received the unusual honor of re-election the two following years. He published "The Pilgrim of Glencoe and other Poems" in 1842. His later publications did not add to his fame. He died at Boulogne in 1844, and was buried in Westminster Abbey, Macaulay, Dean Milman, and other celebrated persons bearing the pall.

C. is an established English classic. With the young, "The Pleasures of Hope" will ever be a chief favorite; while readers of maturer years will linger with delight over the sylvan scenery and tender domestic scenes of "Gertrude." It is in his lyrics, however, that C. has ascended highest into the heavens of song.—"Hohenlinden," "Ye Mariners of England," and "The Battle of the Baltic," cannot be paralleled in the language. Than these lyrics, nothing can be more simple and spirited. Once read, they cannot be forgotten. They will fan the patriotism of many generations.

CAMPBELL ISLAND, a lonely spot on the South Pacific, in lat. 52° 33′ s., and long. 169° 9′ e. Though it is mountainous, and measures only 36 miles round, it is yet valuable on account of its harbors. It is also scientifically interesting, being volcanic, and displaying a rich and rare flora.

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CA'MPBELTON, a royal burgh and seaport, on the east coast, near the south end of the peninsula of Cantire, Argyleshire, and the most important town in that county, is 65 miles west-south-west of Glasgow, on a fine harbor or sea-loch, ¾ miles long, and 1 mile broad. It is noted for the number—between 20 and 30—of its whisky distilleries. It unites with Ayr, Inverary, Irvine, and Oban to return one member to parliament. A sculptured granite cross stands in the principal street, and is supposed to have been brought from Iona. Pop. (1871) 6680. The chief exports are whisky, herrings, and Highland cattle and sheep. In 1874, 8.6 British vessels of 6833 tons, and 18 foreign of 2353 tons, entered the port. C. is a favorite summer resort.

CAMPEA'CHY, a seaport on the west side of the peninsula of Yucatan, which divides the Caribbean Sea from the Gulf of Mexico. It is in lat. 19° 50′ n., and long. 90° 33′ w. Though it has a shallow haven, yet it is the centre of the trade in logwood; it exports likewise cotton and wax. It is a handsome city of 15,000 inhabitants, containing churches, convents, a cemetery, a theatre, a college, and shipbuilding docks. *Campeche* is the Spanish spelling.

CAMPER, Peter, one of the most learned and acute physicians and anatomists of the 18th c., was born at Leyden, 11th May, 1722, and studied medicine there. In 1750, he became professor of medicine at Franeker; in 1755, at Amsterdam; and in 1765, at Groningen. In 1773, he resigned his post, resided some time at Franeker, and then travelled. On being elected a member of the state council in 1787, he removed to the Hague, where he died, 7th April 1789. C. was distinguished not only for the services he rendered to anatomy, surgery, obstetrics, and medical jurisprudence, but also as a promoter of the fine arts. He was remarkably skilful in pen-and-ink drawing, painting in oil, embossed, and even acquired considerable experience as a sculpture. For his observations on the facial angle, see article ANGLE. His work on the connection of anatomy with the art of drawing was an important contribution to the theory of art. Another work, "Description Anatomique d'un Eléphant Mâle," edited by his son, G. A. Camper, and published at Paris in 1802, is also worthy of notice. C.'s collected writings, with plates, appeared under the title, "Œuvres qui ont pour Objet l'Histoire Naturelle, la Physiologie et l'Anatomie comparée." 3 vols. (Par. 1803).

CAMPERDOW'N, a broad tract of low downs which separates the small hamlet of Camp, in North Holland, from the German Ocean, about 30 miles north from Haarlem. It is known on account of the victory obtained, off that part of the coast, by Admiral Duncan over the Dutch fleet, Oct. 11, 1797. The Dutch fleet under Admiral van Winter had stolen out of the Texel, with the view of joining the French fleet at Brest, when it was intercepted by Admiral Duncan, and after an obstinate battle, attended with great loss on both sides, the Dutch admiral was compelled to yield, leaving 8 sail of the line and several smaller vessels in the hands of the English, himself becoming a prisoner.

CA'MPHENE, or Ca'mphilene, is an artificial variety of camphor obtained from turpentine, by acting thereon with the dry vapor of hydrochloric acid, and keeping the whole at a low temperature by immersing the vessel in a freezing mixture. A solid substance is produced, which separates in white crystalline prisms, and has the taste and agreeable aromatic smell of common natural camphor. As prepared, it is strictly a hydrochlorate of C.; but the latter can be obtained free from hydrochloric acid, by passing the vapor of the compound substance over dry heated quicklime, when the acid is held by the lime, and pure C. passes over. It is not so similar to ordinary camphor when thus freed from the hydrochloric acid.

CA'MPHINE is the name applied to a variety of spirit of turpentine obtained from the *Pinus australis* of the Southern States of America, and rather extensively sold and used in Britain for burning in out-of-door lamps. It is very volatile, and burns very freely, giving off a pure white brilliant light; and when the vapor diffuses itself through the air, and is set fire to, it forms a dangerous and violently explosive mixture.

CA'MPHOR is a solid essential oil which is found in many plants, and may be separated from many essential oils. It particularly abounds in certain species of the natural order *Lauraceæ* (q. v.). Almost all of the C. of Commerce is the produce

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of the C. Laurel or C. tree (*Camphora officinarum*, formerly known as *Laurus Camphora*), a native of China, Japan, Formosa, and Cochin-China, and which has been introduced into Java and the West Indies. The genus *Camphora* differs from *Cinnamomum* (see CINNAMON) chiefly in having a thin instead of a leathery calyx. The C. Laurel is a tree of considerable height, much branched, with lanceolate, evergreen leaves on short stalks, and small yellowish-white flowers in axillary and terminal panicles. The fruit is in size and appearance not unlike an imperfectly ripened black currant. Every part of the tree, but especially the flower, smells strongly of camphor. The wood is light and durable, not liable to be injured by insects, and much valued for carpenter's work. In the extraction of the C. from the *C. Laurel*, the wood of the stem and branches is chopped up into fragments, and introduced into a still with water, and heat applied, when the steam generated carries off the C. in vapor. These vapors rise, and in passing through rice-straw, with which the head of the still is filled, the C. solidifies, and is deposited round the straw in minute grains or particles, somewhat about the size of raw sugar or coarse sand. These grains of impure C. are detached, and being introduced into a large globular glass vessel in quantities of about 10 lbs., are reheated, when first the water rises in steam, and is allowed to escape at a small aperture; and thereafter, this aperture being closed, the C. sublimes and resolidifies in the interior upper part of the flask, as a semi-transparent cake, leaving all the impurities behind. The flasks are then cooled and broken by throwing cold water on them, and the C. taken out, and sent into market. The glass globes employed are called by an Italian name, *bomboloes*, the sublimation of C. having been first practised in Venice.—C. was unknown to the Greeks and Romans, and was first brought to Europe by the Arabs. It is a white tough solid, slightly lighter than water, and floats thereon. It is very sparingly soluble in water, but freely soluble in alcohol, ether, acetic acid, and the essential oils. It fuses at 347°, and boils at 399°, and when set fire to, is very inflammable, and burns with a white smoky flame. Thrown upon water it floats, and may be set fire to, when the currents generated alike from the solution in water and the irregular burning of the pieces, cause a curious rotatory motion. It has a peculiar hot aromatic taste, and an agreeable characteristic odor.

C. is used in medicine, both internally and externally, as a temporary stimulant. It is frequently employedin gout and rheumatism. In small doses, it acts as an anodyne and antispasmodic; in very large doses, it is an irritant poison. It is generally reckoned an anaphrodisiac. Its alcoholic solution and liniments in which it is the principal ingredient, are much used for external application in sprains and bruises, chilblains, chronic rheumatism, and paralysis.—The effluvia of C. are very noxious to insects, and it is therefore much used for preserving specimens in natural history.

The BORNEO C. or SUMATRA C. of commerce, sometimes called HARD C., is the produce of *Dryobalanops aromatica*, a large tree of the natural order *Dipteraceæ* (q. v.). The C. is obtained by cutting down the tree, and splitting it into small pieces; being found in crystalline masses in natural cavities of the wood. To this substance, the Chinese ascribe extraordinary medicinal virtues, so that it is sold among them at more than fifty times the price of common camphor. It is seldom brought to Europe as an article of commerce.—The *Dryobalanops aromatica* yields also a pale-yellowish limpid fluid, which gushes out when deep incisions are made in the tree with an axe, and which is generally called LIQUID C. or C. OIL. It is sometimes imported into Europe. It has a smell somewhat resembling that of C. but more aromatic, like oil of cajeput. It is supposed to be from this fluid that the crystalline Hard C. is deposited. See BORNEENE.

CAMPI, a family of artists, who founded at Cremona, in the middle and near the close of the 16th c., an eclectic school of painting, parallel with that founded by the family Caracci (q. v.). GIULIO C. (1500—1572) was the head of the school. He studied painting, sculpture, and architecture, under Giulio Romano. He also imitated the works of Titian (at least in coloring) and Pordenone with such success that his pictures have sometimes been ascribed to both of these artists. His female heads, like those of his brothers, are remarkably beautiful.—ANTONIO C. studied, under his brother, both painting and architecture. His knowledge of the

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latter was very serviceable in several of his paintings; for example, that of the sacristy of St Peter. He was also a plastic artist, an engraver, and the historian of his native place.—VINCENZO C. (b. before 1532, d. 1591) seems to have followed the guidance of Antonio rather than that of Giulio, and excelled more in small figures than in large pictures. His paintings of fruits are highly valued.—BERNARDINO C. (b. 1522, d. about 1590), a kinsman of the three brothers C., was the most famous of the whole. Lanzi terms him "the Annibale Caracci" of the school. He studied first under Giulio C., but soon excelled his master. Afterwards, he choose Giulio Romano, Titian, and Correggio as models, but chiefly followed Raphael, yet without servile imitation. Many of his works are found in Milan and Cremona. In the latter place, the cupola of the choir in the church San-Gismondo is Bernardino's master-piece. He was distinguished as a portrait-painter and engraver. The lady-painter, Sophonisba Angulissola, was a distinguished pupil of Bernardino.

CAMPI'NAS, or San Carlos, a town of Brazil, in the province, and 70 miles north of the city, of Sao Paulo, is situated in a fertile and picturesque district, on a small river, the Piraticaba, a feeder of the Parana. There are large coffee and sugar plantations in the surrounding district, and large quantities of sugar are exported. Many of the houses are built of mud or clay, and the immense church, whose walls are five feet thick, is composed of beaten earth. Pop. 6000.

CA'MPION. See LYCHNIS, and SILENE.

CAMPOBA'SSO, a fortified town of South Italy, in the province of the same name, about 53 miles north-north-east of the city of Naples. The town stands on the slope of the Monte Verde, in a cool, airy, and healthy region. It has a fine cathedral, a ruined castle, some convents, and palaces belonging to resident nobles. It has manufactures of cutlery, which enjoys a considerable reputation for excellence. Its situation, though far from inviting as regards scenery, is favorable for trade, which is facilitated by good roads. Pop. 13,500.

CAMPOBE'LLO, an island of New Brunswick, situated at the mouth of the Passamaquoddy Bay, in lat. 44° 57' n., and long. 66° 55' w. It is small, being 9 miles long, and from 1 to 3 miles broad; but it is decidedly valuable, possessing some good harbors, and, at its north end, a light-house of 60 feet in height.

CAMPO' DE CRIPTA'NA, a town of Spain, in the province of, and about 50 miles north-east of the city of Ciudad-Real. It has manufactures of coarse cloths, and some trade in corn and fruits. Pop. 5250.

CAMPO-FO'RMIO, a village in the province of Udine, Northern Italy, about 7 miles south-west of the city of Udine, is celebrated for the treaty of peace here concluded, October 17, 1797, between Austria and the French Republic. After subjugating Italy (1796), the French army had crossed the Noric Alps, and threatened Vienna. Austria, therefore, hastened to arrange preliminaries of peace. In the treaty which was concluded by Bonaparte with the Count of Coblenz, 17th October 1797, Austria ceded the Netherlands, Milan, and Mantua, and received as compensation the districts Istria, Dalmatia, and the left bank of the Adige in the Venetian states, and the capital, Venice; while France took the remaining territory of Venice, its possessions in Albania, and the Ionian Islands. In the secret articles of the treaty, Austria, in ceding the left bank of the Rhine, was to receive as compensation Salzburg and the Bavarian district on the Inn; and promises were held out to the Duke of Modena, and other Italian houses, that their concessions should be compensated at the cost of Germany.

CAMPOMA'NÉS, Pedro Rodriguez, Count of, Spanish minister and director of the Royal Academy of History at Madrid, founded by Philip V. in 1738, was born in Asturias in 1723. His talents and learning were devoted to the advancement of his native country. By his enlightened views of state policy, as well as by his writings, which ranked him among the most eminent Spanish authors, he obtained a great reputation throughout Europe. He gave effectual assistance to Count Aranda in his difficult enterprise of driving the Jesuits out of Spain. He died February 8, 1802. C.'s chief works are—"Antiguedad Maritima de la Republica de Cartago con el Péripio de su general Hannon, traducido del Griego y illustrado" (Madrid, 1756); "Discurso sobre el fomento de la Industria popular" (1771); "Discurso sobre la

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Educacion popular de los Artisanos y su fomento" (1775); "Apéndice a la Educacion popular" (1775—1777). These writings contained his opinions on politics, taxation, agriculture, manufactures, and commerce. The best known of his financial productions is "Tratado de la Regalia de Amortizacion" (Madrid, 1765).

CA'MPO SA'NTO (Holy Field) is now the Italian designation for a cemetery or burying-ground, but more especially for an enclosed place of interment, surrounded internally by an arcade, and destined to receive the remains of persons of distinction. The most famous C. S., and that from which the others derived the name, is that of Pisa—in the neighborhood of the Dome, and consecrated to the memory of men who had deserved well of the republic. It was founded by Archbishop Ubaldo, towards the end of the 12th century. The archbishop, having been driven out of Palestine by Saladin, brought his fifty-three vessels, which had been destined for the conquest, laden with the earth of the Holy Land. This he deposited on the spot which was thence called the Holy Field, and which, as we have said, gave its name as a generic term to the burying-grounds of Italy. The architect of the existing building was Giovanni Pisano, under whose superintendence it was completed in 1223. It contains an area of 400 feet in length, and 118 in breadth; and is surrounded by a lofty wall, on the inner side of which a wide arcade runs round the whole enclosure, giving to it the character of one magnificent cloister. At the smaller eastern side, there is a large chapel, and two chapels of smaller size on the northern side. The lofty circular arches of the arcade are filled with the richest Gothic tracery, which belongs, however, to a later date—the latter half of the 15th c.—and consequently formed no part of the original design. The walls are adorned with frescoes, which are of great interest and value, both absolutely and with reference to the history of art. The oldest of those which have been preserved adorn one side of the eastern wall: they represent the passion of Christ, his resurrection, and other sacred subjects. These remarkable paintings are supposed to date before the middle of the 14th c., and are ascribed to Buffalmaco. But the most marvellous productions are those of Giotto (q. v.), of Simone Memmi, the friend of Petrarch, and of Andrea and Bernardo Orcagna. As a museum of classical antiquities, the C. S. is perhaps even more remarkable than in any other point of view. Altars, sarcophagi, bas-reliefs, statues, inscriptions, everything that is interesting or curious which has come into the possession of the Pisans for centuries, they have accumulated within its walls.

CAMPVE'RE, now called Vere, Veere, or Ter-Vere, a small fortified town on the north-east of the island of Walcheren, in the Netherlands province of Zealand, four miles north-north-east of Middelburg. It has a port on the Veersche Gat, which runs from the Sloe to the Roompot, separating Walcheren from North Beveland. The town has fallen into decay; but its former prosperity is indicated by the town-house of white freestone, with elegant tower, and the front ornamented by statues of several lords and ladies of the house of Borssele; and by the large and beautiful cathedral church which is no longer used. Pop. (Jan. 1, 1875) 1192. C. owed its name to the ferry (Dutch, *veer*) existing from thence to the village of Campen, in North Beveland, the site of the present hamlet of Kamperland.

From a historical point of view, C. is a town of great interest. In 1304, it was the scene of a battle between William, Governor of Holland and Zealand, and Guy, Count of Flanders, who was victorious. In 1572, the Spaniards were driven away; and a century later, C. was the first town which proclaimed William III., the Prince of Orange, General Stadt-holder. It is chiefly interesting as the seat of a Scottish factory for three and a half centuries. Wolfaard van Borssele, Lord of Campvere, having, in 1444, married a princess of the Stuart line, an impulse was given to the Scottish trade. A factory of merchants was formed, and by contract between the royal burghs of Scotland and the United Provinces, C. became the only staple port. The goods could not be transferred to any other place until sold, merchants resorting thither to do business. The factors obtained many privileges, such as freedom from several duties and the right of being governed by the law of Scotland, having a Lord Conservator who was supreme judge in all matters. No factor might settle at C. without the written authority of the commissioners of royal burghs of Scotland, who took security for his honorable behavior. In 1795, the Batavian Republic withdrew the privileges, and the factory was broken up, but the conservatorship was held as a sinecure long after the necessity for the office had ceased, the

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name of Sir Alexander Ferrier appearing in the "Edinburgh Almanac" as "Conservator at Campvere" so lately as 1847. The magistrates of C. were bound to provide a church for the factory, "to the end that the people of the Scottish nation be not frustrate of the Word of God and exercise of the reformed religion in their own proper language." The ministers were appointed by the commissioners of royal burghs, from 1613 to 1790, when the last appointment was made.

CAMTOO'S, or Gamtoo's, a river of the east division of the Cape Colony, of 200 miles in length. It rises in the Nieuveld mountains, near lat. 32° s., and, flowing through the inland district of Beaufort, and the maritime one of Uitenhage, falls into that inlet of the sea which is immediately to the west of Algoa Bay. It is valuable as an aid to irrigation. For instance, Hankey, a station of the London Missionary Society on its banks, is thoroughly watered by means of a splendid tunnel carried through solid rock at the expense of the association just mentioned.

CAMUCCI'NI, Vincenzo, one of the most distinguished modern historical painters in Italy, was born Rome in 1775. The school of which he became the head was founded on the theatrical antique style of the French painter David. The first important works by C. were the "Assassination of Cæsar" and the "Death of Virginia;" both painted for Lord Bristol at the commencement of the present century. His picture of "Unbelieving Thomas" was copied in mosaic for St Peter's Church. For the church of San Giovanni in Piacenza he executed a "Presentation in the Temple," which was greatly admired. These works were followed by many scenes from Roman history; among them, the pictures of "Horatius Cocles," and "Romulus and Remus" as children. C. who, as a man and an artist, was highly honored during his career, died at Rome, September 2, 1844.

CAMUS, Armand Gaston, a prominent character in the French Revolution, was born in Paris, April 2, 1740. On account of his superior knowledge of ecclesiastical law, he was elected Advocate-general of the French clergy. He was a zealous and ascetic Jansenist, and possessed of extraordinary firmness of character. He hailed the movements of 1789 with joy, and was elected member of the States-general by the people of Paris. In this position, he appeared as the resolute foe of the ancient régime. He gained possession of, and published the so-called "Red Book," giving accounts of court expenditure, which was highly disadvantageous to the court and its ministers. After the flight of Louis XVI., C., with Montmorin, Lafayette, and Bailly, accused the king of treason and conspiracy, and insisted on the suppression of all orders and corporations based on hereditary rights. As conservator of the national archives, he rendered an important service by preserving from destruction the old documents of the abolished corporations and institutions. He was absent in Belgium during the king's trial, but sent his vote for death. In March 1793, when he was commissioned to make prisoners of Dumouriez and other generals suspected of treason, C. himself and his four colleagues were taken prisoners and delivered over to the Austrians (April 3); but, after an imprisonment of two and a half years, he was exchanged for the daughter of Louis XVI. On his return to Paris, he was made member of the Council of Five Hundred, of which he became president, January 23, 1796, but resigned 20th May 1797, and devoted his time to literature. Remaining, however, true to his principles, he voted, July 10, 1802, against Napoleon's proposed consulship during life. C. died of apoplexy, November 2, 1804.

CA'MWOOD, or Ba'rwood, a dyewood which yields a brilliant but not permanent red color, and is used along with sulphate of iron to produce the red color in English Bandana handkerchiefs. It is the wood of *Baphia nitida*, a tree of the natural order *Leguminosæ*, sub-order *Cæsalpinieæ*, a native of Angola. It is preferred to Brazil Wood (q. v.), as producing a finer and richer red.

CANA OF GA'LILEE, called by the natives "Kefr Cana." This place, celebrated in Scripture as the scene of our Lord's first miracle, when he turned water into wine, is now a small village of a few hundred inhabitants, who are principally Greek Christians or Nazarenes, situated about 13 miles west of the Sea of Galilee, and 6 miles north of Nazareth. At the entrance to the village there is a fountain of the clearest and most delicious water—the best, say the Christians of Palestine, in the world: from it, it is supposed, the vessels for the marriage-feast were filled; and near the fountain are also lying the fragments of a Roman column. A house is

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still shewn as that in which the miracle was performed; and some earthen jars sunk into the floor are said to be the very jars in use on that day. A church was built over the spot, but it is now in ruins.

CA'NAAN. See PALESTINE.

CA'NADA, as a geographical designation, has had in history a variety of meanings. Originally, it comprised an extensive range of country reaching, under the French, as far as even the Mississippi, away beyond the boundary lakes. It was subsequently limited to a region chiefly in the basin of the St Lawrence—including in that term both the lakes and the river. C., in the sense in which that word is most generally known, was, in 1791, divided into two provinces, Ontario and Quebec, or Upper and Lower Canada.* These two sections were reunited in 1840, but became separate members of the Confederation—the Dominion of Canada—in 1867. The country composed of these two provinces extends eastwards from near the Red River Settlement to the Gulf of St Lawrence, and from Michigan to New Brunswick. Northward, it reaches from the Canadian lakes and the St Lawrence to the high ridge of land which separates the rivers of C. from those of the region long known as the Hudson Bay Territory, but since 1870 forming a part of the Dominion of Canada. C. is bounded north by the (former) Hudson Bay Territory; east, by the Gulf of St Lawrence; south, by the States of Maine, New Hampshire, Vermont, New York, and the Lakes Erie and Ontario; west, by Lakes St Clair, Huron, and Superior; and north-west, by the Indian Territories. The area of C. is about 331,-250 sq. m., of which 121,260 are in the province of Ontario, and 210,020 in the province of Quebec. The principal river of C. is the St Lawrence, and its most important tributaries are all from the left. The St Lawrence drains an area of 565,000 miles. The Ottawa, 450 miles long, forms the boundary between Ontario and Quebec. The St Maurice, nearly 400 miles in length, and the Saguenay, noted for its fine scenery, rank as rivers of the first magnitude, according to European analogies. The only affluents from the right worth naming are the Richelieu, the St Francis, and the Chaudiere; and even of these subordinate streams, the last two are totally Canadian, while the first, as the outlet of Lakes Champlain and George belongs to the United States only in part.

In 1535, Jacques Cartier, a French navigator born at St. Malo in 1494, entering the St. Lawrence on the festival of the saint of that title, took nominal possession of North America in the name of his king, Francis I. It was not, however, till nearly a century later (1608) that Quebec was taken formal possession of. From that stronghold France ruled for 150 years a vast region, extending eastward to Acadia—Nova Scotia—westward to Lake Superior, and down the Mississippi to Florida and Louisana. In 1759, a small British army—5000 in number—under the command of General Wolfe (q. v.), virtually wrenched *La Nouvelle France*, on the "Plains of Abraham," from her first European rulers by the taking of Quebec. Isle aux Noix, and Forts Oswegatchie and Lévis, successively passed into the hands of the British, and then Montreal was beleaguered and taken by General Amherst with an army of 17,000 men. The capitulation of that city, which was signed September, 1760, brought to a final close the era of French dominion in Canada. The people of the conquered country were secured, by the terms agreed to, in the free exercise of their religion; and peace was concluded between Britain and France in 1763.

In that year, a small portion of the recently acquired territory was organised by royal proclamation under English laws. In 1774, the new province was extended by parliamentary enactment, and that under French laws, down the Ohio to its confluence with the Mississippi, and up the latter stream to its source. Finally, C. receded to its present limits in 1783, giving up to the American republic the sites of six sovereign states—Minnesota, Wisconsin, Michigan, Ohio, Indiana, and Illinois. In 1791, it was divided, under separate legislatures, into two sections,—the eastern retaining French institutions, and the western receiving those of England; and these sections, again, after political discontent had in each ripened into armed insurrection, were re-united for legislative purposes in 1840.

* Throughout most of this article, Canada, or C., is used in this sense; a short notice of the *Dominion of Canada* will be found at the end of the article.

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In 1763, the French population amounted to about 65,000, occupying the immediate banks of the lower St Lawrence and its tributaries. Excepting within the cities of Montreal and Quebec, the immigrants of a different origin, whether from the old colonies or from the mother-country, scarcely attempted to establish themselves among the ancient settlers; thus producing a kind of reciprocal isolation, which, even down to the present day, has not been materially disturbed. Generally speaking, therefore, the two grand elements of the provincial population are locally distinguished from each other—a relative position which has happily excluded, as between them, nearly every difficulty as to education and religion. The settlers of French origin, almost entirely confined to Lower C., occupy the banks of the St Lawrence and of the lower courses of its tributary streams; all the rest of Lower C. and the whole of Upper C., so far as they are reclaimed at all, belong to colonists of English race.

The origin of the name is most probably to be found in the assertion, that Jacques Cartier, the discoverer of Canada, having heard the natives apply the Indian word *Kannatha* (village) to their settlements, mistook it for the name of the whole country.

Upper and Lower C. have presented a striking contrast in their rates of progress. To take, for instance, the growth of towns: In Lower C. there are only two towns with a pop. (1871) above 5000—Lévis, on the St Lawrence, 6691, and Sorel, at the confluence of the St Lawrence and the Richelieu, 5686—in addition to Quebec, Three Rivers, and Montreal, the three French foundations. The growth of Montreal and Quebec, remarkable enough in itself, has been owing rather to their commercial facilities with regard to the country at large than to the agricultural resources of their immediate vicinities; while Toronto, London, Kingston, and Hamilton—each nurtured chiefly by its own locality—have an aggregate population of above 110,000. Great part of Upper and Lower C., more especially the shores of Lake Superior, is valuable only for mineral resources, such as iron, zinc, lead, copper, silver, gold, cobalt, manganese, gypsum, marl, granite, sandstone, limestone, slate, and marbles, of nearly every imaginable color. Considerable portions also, though heavily timbered, chiefly with pine, are yet but little adapted to settlement and cultivation. Towards the Gulf of the St Lawrence, again, a considerable section derives importance mainly from the fisheries, being, with partial exceptions in Gaspe, comparatively worthless for every other object. Thus the area for the profitable production of ordinary cereals cannot materially exceed 40,000 square miles, containing, however, within this space a singularly small proportion of irreclaimable surface. This cultivable block increases regularly in width and fertility from its commencement on the lower St Lawrence to the shores of Lake Huron. Below Quebec—to say nothing of the precarious nature of the crops—there may always be seen, on one or on both sides, the primeval forest. Between that city, again, and the basin of the Ottawa, a gradual improvement shews itself, even on the north side; and towards the south, there stretches away to the frontier of the United States a broad belt of generally undulating character, probably the best field in the country for the blending of pasturage and agriculture. From the basin of the Ottawa inclusive, the parallel of the south end of Lake Nipissing may be said to cut off, towards the south-west, the entire residue of the practicable soil, in the shape of a roughly defined triangle, which, as a whole, is at least equal, in the growth of grain in general and of wheat in particular, to any region of the same extent in North America.

As C. slants southward eight or nine degrees from the mouth of the St Lawrence to that of the Detroit, which communicates between Lakes St Clair and Erie, the climate of the west must be warmer than that of the east. In addition to this cause of difference, it holds as a general law over the continent that the climate improves in advancing westward, even on the same parallel. Besides, the lakes of Upper C. appear, in a good measure, to neutralise and mitigate the extremes of a Canadian climate. While Quebec in winter ordinarily enjoys five or six months of sleighing, the corresponding season in Toronto ranges from five or six days to five or six weeks. As to summer, the difference in favor of Toronto is rather in point of duration than of intensity. As indications of the climate of C., it may be stated that the isle of Orleans, immediately below Quebec, is famous for its plums, and the island of Montreal for its apples; and from the neighborhood of Toronto to the head of

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Lake Erie, grapes and peaches ripen without any aid whatever. Melons, again, of large size, come to maturity, through the settled part of the province, in the open air; and pumpkins and squashes attain enormous size, some of them near Toronto having weighed 300 lbs. The climate of C., though, as a whole, vastly steadier than that of the British Isles, is yet occasionally liable to such changes as among us are all but impossible. Montreal, for instance, may be said, on an average, to have an extreme cold of 24° below zero, and an extreme heat of 96° above it. Now, on short notice, a thaw may surprise the former temperature, and a frost the latter; so that there is room, in winter and summer respectively, for a comparatively sudden rise or fall of about 60°. In fact, it may be said that C. has the summer of Italy and the winter of Southern Russia or North Germany. The following table of temperatures will present a clearer idea of its climatic condition than any description which could be easily given. The cities selected may be accepted as tolerably crucial and convincing on such a question:

Toronto, average summer temperature	67·9°
Paris, " "	64·5
Rome, " "	74·2
Toronto, average winter temperature	24·5
Berlin, " "	31·4
St Petersburg, " "	18·1

But, what is of vast importance to mention, C. lying in the latitudes of the summer rains, and of the most valuable cereals and grasses, the latitude most favorable for animals which enhance domestic wealth—the ox, the sheep, and the horse—occupies one of the best positions in the world for rearing men and women. It lies in the latitude where man attains the greatest energy of body and mind, and from which have hitherto issued the conquering races. C. may thus be looked on as destined to influence the future of the world.

In the matter of communications, C. is unrivalled. The St Lawrence, with its lakes, puts it in connection at once with the most commercial sections of the United States, and with the open ocean. The navigation of this great water-system has been greatly assisted by art. Below Montreal, Lake St Peter has been deepened, so as to admit vessels of over 1800 tons burden; and above that city, a series of cuts, skirting the rapids, admit sea-going vessels into Lake Ontario. Beyond this, the Welland Canal lifts the maritime navigation round the Falls of Niagara into Lake Erie. Without reckoning, therefore, the American works between Huron and Superior, the Canadian settlement at the foot of Sault Ste Marie, now a free port, is virtually, as it were, washed by the tides of the Atlantic. Weekly communication between Liverpool and Glasgow and Montreal and Quebec is furnished by the Allan line of steamers. In addition to the navigation of the main artery, there are numerous canals and navigable streams and lakes throughout the province. The chief canal is the Rideau, connecting the river Ottawa with Lake Ontario.

Over and above all these facilities in the way of navigation, C. is not deficient in roads of every description. To say nothing of the snow and ice, with which, at least in the north and east of the country, the winter paves the length and breadth of land and water alike, or of the macadamised thoroughfares in the older localities, the government has laid out, in the newer and remoter townships, two great systems of highways, seven lines for the upper province, and five for the lower, subsidising, as it were, the same by free grants of 100 acres to each holder on both sides of every route, under condition of residence and cultivation. C. has a network of railways of a total length of 2854 miles. The Grand Trunk, which is at present the longest line in the world owned by any one company and under one management, has an unbroken line of communication from Portland to Lake Huron and Detroit. The Victoria Bridge (q. v.), by which this railway crosses the St Lawrence at Montreal, is one of the wonders of the world. In 1872, the imperial parliament notified the guarantee of a Canadian loan to be applied to the construction of a railway, through British territory, from Canada to the Pacific, but the original arrangements have been departed from, and the undertaking progresses slowly. The western terminus of that great railway will be in Vancouver's Island. At Seymour's Narrows, at the widest span, the distance exceeds only by a little the width of the Menai Straits at

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the site of the Britannia Bridge; and a submerged rock, very similarly situated, is already placed by nature to do the same office as the Britannia rock. Vancouver's Island will thus acquire an additional claim to be entitled "the gem of the Pacific." A series of lines has been recently projected, of which two just finished—the Megantic International and the Intercolonial—give Montreal direct railway communication with St John and Halifax, the chief cities respectively of New Brunswick and Nova Scotia.

The Dominion of Canada.—Canada, Upper and Lower, has been the most valuable province of British America, and perhaps the most important colony of the United Kingdom. But the name has lately acquired a considerable extension of territorial signification. In 1867, an act for the union of Canada, Nova Scotia, and New Brunswick was passed, and by it these provinces were federally united into one Dominion under the crown of the United Kingdom, with a constitution similar to that of the mother country, and with Ottawa for its capital. All the vast territory which the Hudson Bay Company held under a charter issued by Charles II., was transferred to the Imperial Government in December 1869—the Company receiving an indemnity from the Canadian government of £300,000—and was by order of H.M. the Queen in council, received into the Dominion the following year. The portion of that territory known as Selkirk or Red River Settlement has been erected into the province of Manitoba. This province, hitherto known in the mother-country as little more than a region fraught with local rebellion, contains an area of 14,340 square miles, or 9,177,600 acres. It is represented in the senate of the Dominion by two members, and in the House of Commons by four. British Columbia became a member of the Dominion in 1871. Prince Edward Island joined the Confederation in 1873, and the accession of Newfoundland cannot be long deferred; and then the "Dominion of Canada" will be a phrase synonymous with the historical one, "British North America."

This vast extent of territory, a future rival to Russia, and extending from the latitude of Rome to the Arctic Ocean, stands in superficial area (3,500,000 square miles) above the United States (3,390,000), and below Europe (3,650,000). East and west it extends from the 53d to the 141st meridians. The total habitable area is, however, diminished considerably when the frozen regions north of the 60th parallel of latitude are deducted; just as the inhabitable parts of the United States suffer diminution by the arid region west of the 98th meridian, and east of the Rocky Mountains, over which the eye may wander to the horizon without sight of a living thing.

There is no state church in the Dominion. The Episcopal Church is governed by seven bishops; the Roman Catholic Church by one archbishop and eight bishops; the Presbyterian Church, which is in connection with the churches in Scotland, by annual Synods. In the province of Quebec, or Lower C., the Roman Catholic religion predominates—the great majority of the inhabitants being French. All the other religious denominations, Congregationalists, Baptists, Methodists, and many miscellaneous creeds, are well represented.

The population on the 2d day of April 1871, was ascertained to be as follows:

Nova Scotia	387,800
New Brunswick	285,777
Quebec, or Lower Canada	1,191,576
Ontario, or Upper Canada	1,620,850
Manitoba (in 1870)	11,359
North-west Territory (estimated)	28,700
British Columbia (estimated)	50,000
Total Population of Dominion then	3,576,655
Newfoundland	146,536
Prince Edward Island	94,021
Total for British America, or the Dominion to be	3,817,212

The "population by religions" shews that there were returned:

Roman Catholics	1,492,029
Presbyterians	544,698

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Methodists	514,214
Church of England	494,049
Lutherans	37,925
Congregationalists	21,829
Quakers	7,345
Universalists	4,596
Unitarians	2,275

The total revenue of the Dominion of C. for the financial year ending June 1876, amounted to £8,784,418, and the gross expenditure was £8,615,168. The debt of the Dominion, incurred chiefly on account of public works, the interest of which forms the largest part of the expenditure, amounted in 1877 to £27,870,935; and of this capital more than £20,000,000 were payable in London. In 1876 the Dominion had a net-work of railways of 6412 miles, with 1027 in course of construction; while 3600 more had been surveyed. The British government has guaranteed a loan for a railway crossing the Dominion from the Atlantic to the Pacific.

In addition to the troops maintained by the imperial government—the strength of which was reduced, in 1871, to 2000 men—Canada has a large volunteer force, and a militia, brought into existence by a statute of the first Federal parliament, passed in March 1868, "to provide for the defence of the Dominion." The militia consists of all male British subjects between 18 and 60. A general order, issued in 1874, reduced the active militia force to 30,000 officers and men.

The trade of the Dominion is chiefly with the United States and Great Britain, the greater part of the imports being from the latter country, and the greater part of the exports going to the former. The two staple articles of exports to the United Kingdom are bread-stuffs and wool. In the year 1874 the total value of exports from the Dominion was about £18,000,000, and the imports into the Dominion about £28,000,000. In 1877, the values were somewhat less.

The emigrant meets in C. all the main elements of comfort and prosperity—the civilisation of Europe with the cheaper land and higher wages of America. Besides the free grants already mentioned along the newly opened highways, he may at reasonable rates, and under easy terms of payment, select, from many millions of acres, such allotments as may suit his resources, purchasing not only from the government, but also from either of the great companies—the British American for the lower province, and the Canada for the upper. If he has carried with him capital, or has acquired it on the spot by his skill or labor, he will always be able to secure a ready-made homestead for less than it would cost him to erect it. If he has substance to spare, he may invest it in duly registered mortgages at 8 per cent., or else buy blocks of about 50,000 acres each, at prices varying from 9*d.* sterling to 2*s.* an acre, and that on not very onerous conditions of survey and settlement. The Canadians, as a body, are warmly attached to Great Britain. See MONTREAL, TORONTO, QUEBEC, SUPERIOR, VICTORIA BRIDGE. CANADA has recently acquired a more enlarged signification. An act of the imperial parliament (called shortly the *British North America* Act) was passed 29th March 1867, and came into force 1st June of the same year, uniting federally the former separate provinces of Canada, Nova Scotia and New Brunswick into one *Dominion*, under the name of *Canada*. The upper and lower divisions of the former Canada (q. v.) which had been politically united since 1840, are again dissociated, so that the federation consisted, in 1867, of four members or provinces, as under:

	English Square Miles.	Estimated Pop. (1867).
Quebec (formerly *Lower Canada*, or *Canada East*)	210,020	3,800,000
Ontario (formerly *Upper Canada*, or *Canada West*)	121,260	
New Brunswick	27,105	
Nova Scotia	18,660	
Total	377,045	

The constitution of the Dominion is after the model of the mother-country. The parliament consists of the Queen, an Upper House, styled the Senate, and a House of Commons. The Queen is represented by a Governor-general (with a salary of £10,000), who exercises his authority with the aid and advice of a council, styled the

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Queen's Privy Council for Canada, chosen from time to time by the governor. The Senate, in 1867, consisted of not more than 72 members, 24 for each of the provinces of Ontario and Quebec, and 12 each for the maritime provinces. The senators are chosen by the governor-general, and hold the appointment for life. Among other qualifications, a senator must have real property to the value of 4000 dollars, and must be resident in the province for which he is appointed. The Speaker of the Senate is nominated by the governor-general. The House of Commons consisted at the same date of 181 members—82 for Ontario, 65 for Quebec, 19 for Nova Scotia, and 15 for New Brunswick. The duration of a House of Commons is five years. Until the parliament of Canada otherwise provides, the franchise and other regulations are to be the same as those hitherto in force in returning members to the House of Assembly in the several provinces. The House of Commons elects its own Speaker. Any bill passed by the houses of parliament, even though assented to by the governor-general in the Queen's name, may afterwards be disallowed by the Queen in Council. Each province has an executive and legislature of its own, presided over by a lieutenant-governor, and constituted in the meantime pretty much as before the union. The lieutenant-governors are appointed by the governor-general. The provincial parliaments may, under the provisions of the act, amend from time to time their own constitutions.

In the distribution of legislative power between the general and the provincial parliaments, certain classes of subjects of a local nature are assigned exclusively to the legislatures of the provinces, while subjects of more general concern are assumed by the parliament of Canada. Among the subjects enumerated in the act as coming under the latter description are: the public debt and property; taxation (for federal purposes), postal service, military and naval defence, the salaries of the civil officers of the general government; the census; navigation; money, weights, and measures; copy-rights; marriage and divorce; criminal law. The provincial legislatures, again, have the power of taxing themselves for provincial purposes, and of borrowing money on the sole credit of the province; of regulating and paying provincial officers; of establishing asylums, &c. Education is also left to the provincial legislatures, with certain provisions against encroachment on the rights of religious minorities.

The debts of the several provinces, at the union, are assumed (with certain limitations) by the federal government: and, on the other hand, certain duties and revenues, and certain public works and properties belonging to the several provinces before the union, are taken possession of, to form a consolidated revenue fund for defraying the interest of these debts, and for the other expenditure of the federal government.

Provision is made for the introduction of uniformity of laws, which, however, must be with consent of the legislatures of the several provinces.

The union of the various British American provinces had been long and eagerly discussed, public opinion in Canada being generally in its favor, but in the other provinces strongly opposed to it, from the natural apprehension, that the immense preponderance of C. in population, wealth and general importance would utterly swamp the others. However, after much and careful consideration, the great advantages which it was shewn the scheme would confer, overcame the provincial jealousies, the pro federalists in Nova Scotia and New Brunswick, came to preponderate, and these two provinces were 1867 united with Quebec and Ontario to form the Dominion of Canada. In British Columbia and the Hudson's Bay Territories the feeling in favor of annexation was strong, and in 1869 the latter, and 1871 the former, was transferred to the imperial government. The Hudson's Bay Company received an indemnity of £300,000. In 1871 the Red River Settlement was formed into a province under the name Manitoba. In 1873 Prince Edward Island was annexed. The only part of British North America which stands aloof is Newfoundland, but provision has been made for its admittance in the Act of Union, and its accession cannot be long deferred. The area of the vast dominion is about 3,500,000 sq. m., exceeding that of the United States, and little inferior to Europe. See CANADA. The number of members of parliament given above has, of course, been increased by the representives of the new provinces—viz., 2 senators and 4 members of the House of Commons for Manitoba, 3 senators and 6 members for British Columbia, and 4 senators and 6 members for Prince Edward Island. The total

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(with the few additional members in the old provinces) was, in 1877, 78 senators, and 206 members of the House of Commons.

CANADA BALSAM is a kind of turpentine (q. v.) obtained from the Balm of Gilead Fir (*Abies* or *Picea balsamea*), a native of Canada and the northern parts of the United States. See FIR. It exists in the tree in vesicles between the bark and the wood, and is obtained by making incisions, and attaching bottles for it to flow into. It is a transparent liquid, almost colorless, and with an agreeable odor and acrid taste. It pours readily out of a vessel or bottle, and shortly dries up, and becomes solid. When fresh, it is of the consistence of thin honey, but becomes viscid, and at last solid by age. It consists mainly of a resin dissolved in an essential oil, and its composition is as follows:

Essential Oil	18·6
Resin, soluble in Alcohol	40·0
Resin, sparingly soluble	33·4
Elastic Resin	4·0
Bitter Extractive and Salts	4·0
	100·0

It is the finest kind of turpentine obtained from any of the *Coniferæ*, and is much employed for medicinal purposes, particularly as a stimulant for the cure of mucous discharges, and as a detergent application to ulcers. It is also used for a variety of purposes in the arts—as an ingredient in varnishes, in mounting objects for the microscope, in photography (q. v.), and by opticians as a cement, particularly for connecting the parts of achromatic lenses to the exclusion of moisture and dust. Its value for optical purposes is very great, and depends not only on its perfect transparency, but on its possessing a refractive power nearly equal to that of glass.

CANADA GOOSE. See GOOSE.

CANA'L, an artificial channel for water, formed for purposes of drainage, irrigation, or navigation, but now usually employed to designate only such cuts as are intended for the passage of vessels.*

Canals date from a period long anterior to the Christian era, and were employed as a means of irrigation and communication by Assyrians, Egyptians, and Hindus; also by the Chinese, whose works of this kind are said to be unrivalled in extent; one of them, the Imperial C., having a length of about 1000 miles. For the most part, however, these early canals were of one uniform level, and hence exhibit no great skill or ingenuity; and the moderns were content to follow the rudimentary efforts of the ancients in this way until the 15th c., when the invention of the Lock (q. v.)—shewing how canals might be generally and advantageously used for inland navigation, in countries whose surface was irregular—gave a great impulse to this branch of engineering. The Italians and Dutch, for both of which nations the invention of the lock has been claimed, were the first to develop this kind of engineering in Europe. In France, the first C., that of De Briare, to form a communication between the Loire and the Seine, was opened in 1642. In 1681 was completed the greatest undertaking of the kind on the continent, the C. of Languedoc, or the C. du Midi, to connect the Atlantic with the Mediterranean. The length of this C. is 148 miles, it has more than 100 locks, and about 50 aqueducts, and in its highest part it is no less than 600 feet above the sea. It is navigable for vessels of upwards of 100 tons. It was not until nearly a century later that C. navigation assumed importance in England, through the sagacity, energy, and liberality of the Duke of Bridgewater (q. v.), and his celebrated

* In the fen-districts of the east coast of England, however, the large channels required for drainage are made subservient to purposes of inland navigation by sluices at the mouth—one to keep out the tide at high water, and another acting in the opposite direction, to retain water of depth sufficient in the channel to float such boats as make use of it. These combinations of drain and canal are commonly called *navigations;* hence the workmen employed in their construction were called *navigators*, which, contracted into *navvy*, is now applied indiscriminately to persons engaged in any kind of earth-works.

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engineer, James Brindley (q. v.). The success of these works stimulated other public persons to engage in similar undertakings. Speculation in C. shares became a mania similar to that which overtook the people in connection with railways at a more recent period, and a crash ensued on the prospect of war in 1792. It would be an endless task to pursue the history of canal development in Britain, which speedily became intersected with these watery highways to an extent unequalled in any European country save Holland. In the space at our disposal, we shall briefly consider the several kinds of canal. See SUEZ, and SUEZ CANAL.

Canals may be divided into three general heads—viz., 1. Canals proper, i. e. entirely artificial channels, having no water running through them beyond what is necessary for their own purpose; 2. Tidal, i. e., affected by the rise and fall of the tides; and 3. Rivers rendered navigable by weirs built across them to increase their depth, and having a lock at one end for the ascent or descent of vessels; and occasionally, when there is much fall, or any formidable obstruction in the river, by lateral cuts, with locks for part of their course.

Another division may be made (1) of ship-canals for the transit of sea-going vessels generally, from sea to sea; these are necessarily of large dimensions, and must be crossed by swing or draw bridges; and (2) of canals for the passage of mere boats or barges, generally without masts, so that they may be crossed by stone or other solid bridges. The largest ship C. in Europe is the Great North Holland C., completed in 1825, which has a breadth of 125 feet at the water-surface, and of 31 feet at the bottom, with a depth of 20 feet. It extends from Amsterdam to the Helder, a distance of 51 miles; it thus enables ships of as much as 1400 tons burden to avoid the shoals of the Zuyder Zee. The surface of the water in this C. is below the high-water level of the German Ocean, from which it is protected by embankments faced with wicker-work. The locks on this C. are 297 feet long, 51 feet broad, and 26 feet deep. There is a similar C. from near Rotterdam to Helwoetsluis, to avoid the shallows of the Brill at the mouth of the Maas. Another great ship C. is the Caledonian C. (q. v.). The Forth and Clyde C. is also one on a smaller scale for the passage of sea-going-vessels. Its length is 35 miles; its medium width is 56 feet at the surface, and 27 feet at the bottom, and its depth 9 feet. It has 39 locks, each 75 feet long, and 20 feet wide, and a rise of 155 feet. In constructing ship-canals, it is important to secure a sheltered entrance, one not likely to become silted up, and of sufficient depth to admit vessels at all times of the tide; and towing-paths on both sides are desirable.

Among the principal canals in England for the passage of barges, some of which run to very great elevation, are the—

	Length. Miles.	Rise. Feet.
Grand Junction	128	
Leeds and Liverpool	128	433
Trent and Mersey	93	326
Kennet and Avon	57	402

The C. of the Loire is one of those aiding the navigation of the river. It has a width on the water-line of 33 feet, and a depth of 5¼ feet, the locks being 17 feet broad, and 100 feet long. The river Lea and the Mersey and Irwell Navigations in England, and the Welland C. in Canada, formed to connect Lake Erie with Lake Ontario, and avoid the Falls of Niagara, are also among the most noteworthy works of this class; the river Thames, above the first lock at Twickenham, partakes also of the nature of a canal.

Many canals pass through long tunnels, some very low and without towing-paths, in which case the mode of propulsion is by the boatmen lying on their backs and pushing with their feet against the roof of the tunnel.

The great expenditure of water and time in "locking" have led to the trial of various other plans for overcoming differences in level. On the Great Western C., boats are raised and lowered by means of machinery, called a perpendicular lift. On the Morris C. (United States), boats are conveyed on a carriage up a railway inclined plane, from one reach to another; on the Chard C., Somersetshire, and on the Monkland C. near Glasgow, they are taken afloat in a caisson, or water-tight vessel, up or down an inclined plane—in the latter case, empty boats of 60 tons burden are raised or lowered 96 feet.

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Other matters engineers have to consider are an ample supply of water, by means of feeders and reservoirs, to the summit level; stop-gates at convenient distances, to shut off the water in case of damage to any part of the C.; means of drainage when repairs are necessary; and provision against leakage through the banks, by puddling or otherwise. The floor-line or bottom of a C. is usually made twice the width of the largest boat likely to enter the C., with an addition of 6 or 8 inches for play at each side, and the depth 12 or 18 inches more than the draught of the boat.

The introduction of railways has materially interfered with C. traffic, and some canals have been altogether abandoned. Many, however, still continue to prosper, as, for instance, the Grand Junction, the Lea Navigation, and the Trent and Mersey. It is estimated that the inland boat navigation constructed in Great Britain exceeds 4700 miles. In the United States there are upwards of 4000 miles of C., of which 1300 miles are in New York State. The C. system has also been very extensively carried out in France, which has a large mileage of artificial inland water navigation. A new canal, which shortens the distance from Amsterdam to the North Sea to 15 miles, has recently been completed. The harbor is near Wyk-aan-Zee, and the minimum width is to be 80 yards. This canal was constructed mainly by British capital and engineers.

Laws regarding Canals.—The traffic, and generally the rights, duties, and liabilities of canal companies are regulated by two acts of parliament, the 8 and 9 Vict. c. 42, and the 17 and 18 Vict. c. 31, called "The Railway and Canal Traffic Act, 1854." The word *canal* is declared to include any navigation whereon tolls are levied by authority of parliament, and also the wharves and landing-places used by such canals or navigation; and *traffic* is defined as including not only passengers and their luggage, but also goods, animals, trucks, boats, and vehicles of every description. All tolls and charges in respect of the traffic are to be charged equally to all persons. It is declared to be the duty of canal companies to make arrangements for the receiving and forwarding of traffic without unreasonable delay, and without partiality; and facilities are given for a remedy to parties complaining of want of attention in these respects.

According to section 7 of the 17 and 18 Vict. c. 31, companies are liable for neglect or default in the carriage of animals or goods, although they may have given notice to the contrary. Where the effect of such neglect or default occasions the loss of or injury to animals, the act provides that no greater damages shall be recovered than as follows: for any horse, £50; for any neat cattle, per head, £15; for any sheep or pigs, per head, £2, unless at the time of delivery for transit, the animals were declared to have been of higher value. No special contract between the company and parties employing the canal shall be binding on the latter unless signed by them. The act saves the rights, privileges and liabilities of companies under the Carriers' Act, the 11 Geo. IV. and 1 Will. IV. c. 68.

Injury to canals, with intent to obstruct the navigation, is punishable with penal servitude for not more than seven, or less than three years; or imprisonment for two years, with the addition of hard labor, solitary confinement, and whipping, at the discretion of the court. See CARRIERS.

CANALE'TTO, or Cana'lé, the name of two Venetian painters, who have acquired a reputation for their landscapes and views of towns. The elder, Antonio C., born 1697, was the son and pupil of a theatrical decorator in Venice. He studied at Rome. He painted a numerous series of excellent views in Venice, among which that of the great canal are especially admirable for their fresh coloring, faithfulness, and the invention displayed in accessory objects. He came to England by the advice of Amiconai. He died in 1768, after having acquired both wealth and fame by his representations of English scenes, several of which are in Buckingham House, and are highly admired.

BERNARDO BELLOTTO, surnamed CANALETTO, nephew and pupil of Antonio, was born at Venice, 1724, and attained high excellence as a painter, and also as an engraver on copper. He practised his art in his native place, and afterwards in Rome, Verona, Brescia, Milan, and Dresden. Correct perspective, powerful effects of light and shade, and beautiful sky-tints, are the most prominent characteristics of his works. C. visited England, where, among several other excellent works, he

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painted a masterly interior view of King's College Chapel, Cambridge. He died in Warsaw, 1780.

CANAMI'NA, a town of Dahomey, Africa, about 18 miles south of the capital, Abomey. It is situated in the midst of a cultivated plain, and has a house for the accommodation of white men, set apart by the king. Pop. 10,000.

CANANDAI'GUA, a beautiful village in New York, U. S., at the north of the lake of the same name, on the Rochester and Syracuse Railway. Pop. (1880) 5,726.

CANANO'RE, a seaport and military station of the district of Malabar, in the presidency of Madras. It is in lat. 11° 52′ n., and long. 75° 26′ e., being about 50 miles to the north of Calicut. The town stands at the head of a bay, which, opening from the south, forms its harbor, while the fort and cantonments occupy the bluff headland, which shelters the inlet on the side of the Arabian Sea. Besides pepper, grain, and timber, the neighborhood produces immense quantities of cocoanuts, which are largely exported to the northward, where they are said to be scarce. C. has been a British possession since 1791, having in that year been taken from Tippoo Sultan. Pop. (1871) 31,070.

CA'NARA, a region on the west coast of the Indian peninsula, comprising two British collectorates. NORTH C., also called *Honawar*, the most southerly portion of the Bombay province, is like the other districts in the coast southwards, exceedingly fertile. The area of the district is 4235 square miles, and the population was 298,406 in 1872. SOUTH C., a narrow strip of hilly and very fertile country, lies in the Malabar, like the preceding, but is comprised for administrative purposes in the province of Madras. It is sometimes called *Mangalore* from its chief town. Area, 3902 square miles; pop. in 1871, 918,362.

CA'NARAC, a town on the Orissa coast, at the north-west angle of the Bay of Bengal, in lat. 19° 54′ n., and long. 86° 10′ e., being 235 miles to the south-west of Calcutta. It is remarkable chiefly for the remains in its vicinity of a colossal pagoda. The entire area, a square of about 13 acres, is said to have been surrounded by walls 150 cubits high and 19 broad; and the principal materials appear to have been red granite and black basalt, some of the blocks measuring 15 or 16 feet in length, by 6 or 8 in width, and 2 or 3 in thickness. Most of the sculptured embellishments have been removed to the temple of Juggernaut, which is in the same district of Pooree as C. itself.

CANA'RIES, or Cana'ry Islands, a group of islands belonging to Spain in the Atlantic Ocean, off the north-west coast of Africa, in lat. 27° 40′—29° 25′ n., and long. 13° 25′—18° 16′ w., forming a Spanish province. The group consists of seven large and several small islets, with a joint area of about 3800 sq. m., and a pop. of (1870) 288,859. The principal islands proceeding from east to west, are Lanzarote, Fuerteventura, Gran Canaria, Tenerife, Gomera, Palma, and Hierro or Ferro. The coasts are steep and rocky, and the surface is diversified with lofty mountains (the greatest elevation being attained in the *Pico de Teyde*, in the island of Tenerife, which has a height of 12,182 feet), narrow gorges, and fertile valleys. All the islands are of volcanic origin. On the summits of the highest elevations, depressions, like those left by fallen cones of volcanoes, are almost everywhere found; and the steep declivities are marked by deep fissures, of which, usually, only one penetrates the depressed summit, and exposes to view the several strata of the volcanic rock. There are numerous torrents, but no rivers, and fresh water is very scarce in the southern parts of the islands, and especially in Hierro.

The researches of Humboldt and Von Buch led to the division of the botanical geography of Tenerife into five distinct regions. The first, or region of African forms of vegetation, extends to about 1800 feet above the sea, and is marked by the growth of the date palm, sugar-cane, dragon's-blood tree, &c. The second region extends to the height of 2800 feet, and produces vines, corn, maize, olives, chestnuts, &c., in luxuriance. This zone represents the vegetation of Southern Europe. In the third region, rising 1200 feet or so higher, we have laurels and evergreens. In the fourth, extending to above 6000 feet, we find vegetation nipped by cold and excessive dryness, snow falling several months of the year, and only the *Pinus Canariensis* and other coniferæ flourishing. The fifth region attains an elevation of nearly 11,000 feet. Here are found a kind of *Spartium* (Broom) peculiar to this

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some, with cedrine junipers, and one Alpine plant, *Arabis alpina*. The barren mountain-peaks are just below the limit of perpetual snow, although in a cavern at the height of 11,000 feet above the sea, snow is said to be preserved throughout the year. All the rest of the islands are similar in character, with the exception of Fuerteventura and Lanzarote, which are less elevated, more abundantly wooded, and more luxuriant in vegetation generally.

Minerals are few, and of little importance. Near the sea, the general temperature ranges from 60°—66° F., in January, to 78°—87° F., in October. The rainy season lasts from November to February; from April to October, the weather is uniformly fine. The islands, however, suffer much from the e. and s. e. winds, which, blowing over the hot deserts of Africa, burn up vegetation, and generate disease. Very little wine is now produced, the grape-disease having destroyed almost all the vines. Cactus plants, on which the cochineal insect feeds, now mainly occupy the desolated vineyards, and the value of cochineal exported in 1874 was £435,000 out of a total value for exports of £546,244. Other products are cereals, tobacco, potatoes, barilla, oil, and fruits. The chief foreign trade is with the United States, England, and Hamburg. There is little manufacturing.

TENERIFE, the largest island of the group, has an area of 877 miles, with a population of 95,000.* In the north-west of this island, which is the principal seat of the cochineal cultivation, is situated the famous Pico de Teyde, or Peak of Tenerife (q. v.). The chief town and port is Santa-Cruz de Santiago (q. v.), on the north-east coast.

GRAN CANARIA, which is next in importance, has an area of 758 square miles, with a population of 69,000. Its culminating peak is El Cumbre, with a height of 6648 feet. The capital, Las Palmas (q. v.), on the east coast, is the largest town of the archipelago.

PALMA has an area of 718 square miles, and a population of 33,000. Its highest peak, Pico de los Muchachos, has an elevation of more than 7600 feet. Capital, Santa-Cruz des las Palmas (q. v.), on the east coast.

The area and population of the other islands are as follows: LANZAROTE is 328 square miles, pop. 17,400; FUERTEVENTURA, 326 square miles, pop. 13,800; GOMERA, 169 square miles, pop. 11,700; HIERRO, 82 square miles, pop. 4400. The chief towns of these islands are small.

The C. are supposed to have been the Fortunate Islands of the ancients. The Carthagenians are said to have visited them, and Juba II., king of the two Mauritanias, wrote an account of them that has been transmitted to us by Pliny. In modern times, the first account of them was furnished in the first half of the 14th c., by the crew of a vessel that had been driven among them by stress of weather. A Spanish gentleman obtained a grant of them from the pope; but when an attempt at settlement was made, the Spaniards were driven off by the natives. In the beginning of the 15th c., the Spaniards succeeded in obtaining a footing in the islands; but a difference having arisen with Portugal concerning them, it was not until 1492 that the authority of Spain was finally established. Since that time they have remained attached to the Spanish crown. The Guanches, who were the aborigines of the islands, have long ceased to exist as a separate people, the population being now quite Spanish. They were a brave and intelligent race.

CANA'RIUM, a genus of trees of the natural order *Amyridaceæ*, natives of the south-eastern parts of Asia, the Malayan Archipelago, &c. The fruit is a drupe. The kernel of the fruit of *C. commune* is eaten both raw and roasted; and in Amboyna, bread is made of it, which is generally in the form of rolls about a yard long and an inch thick. An oil is expressed from it, which is used both for the table and for lamps. The tree is about 50 feet high. *C. sylvestre* also produces eatable kernels. *C. commune* is supposed to be one of the trees which yield ELEMI (q. v.), and *C. microcarpum* yields an oil very like copaiva, known in ship-building yards as DAMAR (q. v.).

CANARY, or Canary Bird, a beautiful little bird, very common as a cage-bird, and much esteemed for its musical powers. It is one of the numerous family of

*The pop. of the separate islands is not from the census of 1870, of which only the total return is available.

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finches (*Fringillidæ*), and is *Fringilla Canaria* of Linnæus. Some modern ornithologists place it in the genus *Carduelis*, others in *Linota*; it is indeed intermediate between these genera, the goldfinches and the linnets. Some make it the type of a genus or sub-genus, *Canaria*. It is found in Madeira, the Canary Isles, and the Cape Verd Isles; frequents the neighborhood of human habitations; builds its nest of moss, feathers, hair, &c., in thick, bushy, high shrubs or trees; and produces four, five, or even six broods in a season. In its wild state its plumage is greenish, or greenish-yellow, sometimes tinged with brown, and exhibits less variety and beauty than in domestication. It was brought to Europe in the beginning of the 16th century. It breeds readily in confinement, and seems thoroughly reconciled to its cage-life; but although canaries of long domesticated races sometimes excel in imitative powers and acquired strains, yet they are surpassed in loudness and clearness of note by some of the wild birds, which, when caught and imported, are occasionally sold for extraordinary prices. Even in confinement, the C. often breeds four or five times a year, laying from four to six eggs each time. The eggs are pale blue. The male assists the female in building the nest and in feeding the young. Besides seeds of various kinds, which are their principal food, canaries are very fond of bland green leaves, such as those of chickweed, a supply of which is very necessary for their health; and one of their favorite luxuries is sugar. The C. not unfrequently lives 15 or 16 years. It can be taught various notes and airs, and some even learn to articulate words. The rearing and training of canaries afford occupation to no small number of persons, particularly in the Tyrol. The C. hybridises readily with some other species of finch, producing "mules," some kinds of which are valued as song-birds.—There are several species very closely allied to the C., one of which, a beautiful little bird, entirely yellow, with an orange crown, a native of Brazil, is sometimes sold in Britain as a song-bird, but its musical powers are very inferior to those of the common species.

CANARY GRASS (*Phalaris Canariensis*), a grass of which the seed is much used, under the name of *canary-seed*, as food for cage birds, and which is, on that account, cultivated to some extent in the south of Europe, and in certain districts of Germany and England. It is a native of the Canary Islands, naturalised in the south of Europe, and in many places in Britain. The chief seats of its cultivation in England are the counties of Kent and Essex. The seed is sown early, generally in February, yet the crop is not reached till after the ordinary grain harvest, for which reason the cultivation of C. G. is seldom attempted in the northern parts of Britain.—This grass attains a height of two or three feet, and has a crowded, egg-shaped, spike-like panicle, from an inch to almost two inches long; the spikelets are one-flowered, very much laterally compressed, a rudimentary scale-like floret on each side of the perfect floret; the *glumes* winged on the keel, and with two stripes of darker green on each side; the *palea* awnless, shining, and at last firmly enclosing the seed. A fine flour is prepared from canary-seed, which is employed as dressing in fine cotton-weaving, and for the finishing of silken stuffs. The groats and flour of this small kind of grain are also used in the Canary Islands, in Barbary, and in Italy, as food, the flour being made into bread, which is very nutritious and pleasant.—Other closely allied species of *Phalaris* produce a similar grain, but are inferior in productiveness and quality.—A grass, now generally referred to this genus, and sometimes called REED C. G. (*Phalaris arundinacea*), is very common on the banks of lakes and rivers, and in other wet places in Britain, and throughout Southern and Central Europe. It differs very much in appearance from C. G., having a large spreading panicle, generally of a reddish color; and the glumes are not winged at the keel. It is a somewhat reed-like grass, 4—6 feet high, with creeping roots, which help to secure river-banks; and yields a great bulk of hay, but has been very generally despised as a coarse grass, fit only for littering cattle. The justice of this opinion has, however, been called in question, and the grass proclaimed to be very nutritious, and sufficiently acceptable both to horses and oxen when cut early. It may be mown twice a year. A variety with curiously striped leaves is well known in gardens, as *Ribbon Grass*, *Gardeners' Garters*, or *Ladies' Traces*.

CANARY PLANT. See TROPÆOLUM.

CANARY WINE, also known as TENERIFE, is the produce of the Canary Islands, and resembles Madeira; but the name is properly applied only to the

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Bidogne wine, which must be distinguished from the Malvoisie of the Canaries. The former is made from grapes gathered before they have ripened, and, when new, is crude and unpleasant; but in the course of two or three years, increasing in mildness as in age, becomes so much like Madeira, that it is often sold for it. Like Madeira, it is greatly improved by a voyage to the tropics. It is produced chiefly on the island of Tenerife, and the trade in the wine is mostly carried on at the chief port of this island. The Canary of the island of Palma is inferior to Tenerife, but may be consumed sooner, and has a pleasant flavor.

CANA'STER, the name given to a rush-basket in which tobacco is placed in Spanish America; hence is said to be derived the name canaster, now applied to tobacco of a certain kind.

CANCELLA'RIA, a genus of mollusks—class *Gasteropoda* (q. v.), order *Pectinibranchiata*—with univalve shells, sometimes regarded as belonging to the family *Volutidæ*, or Volute Shells (q. v.), but now generally placed among *Buccinidæ*, or Whelks (q. v.). The spire is prominent, the last whorl ventricose, the surface reticulated, the mouth large, the columella plaited. All the recent species are natives of tropical or subtropical seas, and are found chiefly on sandy bottoms, at the depth of a few fathoms. The fossil species, amounting to nineteen, occur in the newer strata from the chalk upwards.

CA'NCELLING OF DEEDS AND WILLS. The word cancel comes from the Lat. *cancelli* (lattice-work), and a deed was formerly said to be cancelled when lines were drawn over it in the form of lattice-work. The word cancel is now used to signify any sort of obliteration.

The Court of Chancery in England gives relief against the effect of improper cancellation; on the other hand, it may order a deed which has been improperly obtained to be delivered up in order to be cancelled. The effect of the cancellation is to make the deed void. If a deed is given up to be cancelled, and the cancellation does not take place, it remains in force at law. But if an obligee deliver up an obligation to be cancelled, and the obligor do not afterwards cancel it, and the obligee happen to get it again into his hands, and sue the obligor on it, the latter cannot plead its voidance, for the deed still remains in force at law,—although here, too, equity would relieve, and decree according to the original cancellation. Where a deed is cancelled by consent of the parties to it, it is thereby destroyed as to their interest under it, but third parties may still produce it in evidence. As to a will, its cancellation may have the effect of revoking it, if done with such intention.

In Scotland, the system of registration of deeds and other writings prevents the occurrence of many of the questions that arise in England on this head, but the intention and effect of the cancellation or destruction of documents would in most cases be a question of evidence; and where it is necessary to know the contents of the destroyed paper, its effect may be judicially declared by a form of suit called an action for *proving the tenor*, as indeed may be done in an English court of equity by a bill to recover the contents of a lost document. In the Scotch law, again, a deed or other writing may be judicially cancelled or set aside by an action of reduction, and the courts in England substantially exercise a similar jurisdiction.

It would appear that where a testator has prescribed certain forms for the authentication of his will, and such forms have either not been observed by him, or if observed, have, in some essential particular, been negatived by obliteration, an intention to revoke will be presumed: thus, where a Scotchman, who had long resided in India, executed a will, concluding, "In testimony of this being my last will and testament, I hereto set my hand and seal;" and the document was found in his repositories with the part to which the seal had evidently been affixed cut (not torn) off, the House of Lords held the deed to be cancelled, because the testator had himself, besides the usual solemnities, prescribed a seal as necessary to the authentication of his will. A will, however mutilated or cancelled by a testator during his insanity, would be good: and of course, there is no effectual cancellation when done by a third party without sufficient authority. But all such considerations are questions of evidence. See DEED, WILL.

CANCELLING OF LETTERS-PATENT. The Lord Chancellor may cancel the Queen's Letters-Patent, when granted contrary to the law, "which," says

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Blackstone, quoting Sir Edward Coke, "is the highest point of his jurisdiction." See LETTERS-PATENT, CHANCELLOR.

CA'NCER, a disease characterised by slow alterations of structure, or tumors in various parts of the body, occurring either simultaneously or in a certain order of succession. In many cases an isolated tumor in an external part is the earliest symptom; it is then viewed as the starting-point of the disease, and is termed a *malignant tumor* (*tumor mali moris*), from its presumed tendency to infect the system, and to cause the reproduction of growths similar to itself. It is right, however, to remark that upon the pathology of C. authorities are by no means agreed, some holding that a constitutional taint or *diathesis* must always precede any local development of C., and that the first growth in point of time (or primary C.) is therefore only the first of a series determined by a pre-existing cause in the blood or general system; while others hold that C. is originally a truly local disease, or even that a growth at first simple (*non-malignant* or *benign*), may in consequence of local causes, *degenerate*—i. e., become cancerous and affect the whole system with the morbid tendency thus secondarily acquired. The discussion of this disputed question involves statements of a too complicated kind to be in place here; but it is a question of considerable importance, as bearing on the probability or improbability of curing the disease by extirpating the primary tumor at an early stage of its development. All authorities are agreed that, when any trace of secondary C. exists, the removal of the parts affected gives scarcely any hope of a favorable result, and, accordingly, operations under these circumstances, unless merely for the relief of local suffering, are discountenanced by all respectable surgeons. The disease, however, is one of which the ignorant as well as the learned have a well-founded dread, and hence it presents a large field for the practice of imposture, and for that less deliberate, but often not less hurtful kind of quackery which is the result of pure ignorance, grafted on a meddlesome desire to do good. We propose to give such a sketch of the characters and progress of cancerous disease as may serve, in some degree, as a protection against ignorance on the one hand, and deception on the other.

The leading character of C. being a tumor or morbid growth in a part, it is important, in the first place, to observe that not all, nor even the majority, of morbid growths are cancerous. A very large proportion of growths, involving swelling or change of structure in a part, are either determined by a previous process of inflammation—leading to chronic abscess and induration—or belong to what is called the non-malignant order of tumors—e. g., cysts, fatty and fibrous tumors, simple hypertrophy of glandular structures, cartilaginous, bony, calcareous, and vascular growths. See TUMORS. Further, among the tumors admitted by general consent into the order of cancerous, there are widely different degrees of *malignancy* or *cancerousness*, so to speak; some having the tendency to spread rapidly, and infect the system at any early period, while others remain local for a considerable time, and may be removed while yet local, with good hope of a permanent recovery.

Now, the practical distinction, or *diagnosis*, to use the technical phrase, of these different tumors, is founded upon a very careful and delicate appreciation of the characters of the malignant and non-malignant tumors, considered as morbid products, and also upon a thorough knowledge of the anatomy and relations of the textures in which they arise. One of the leading characters of malignant tumors is the tendency to involve, by a kind of specific destruction or degeneration, the ultimate elements of the textures in which they arise, and in which they spread. The attempt, therefore, to distinguish these from other growths, must always call for the highest qualities of the surgeon—large experience, guided at every step by consummate science, and, in particular, by minute and thorough knowledge of natural structure. And the difficulties of the inquiry are such, that even in the dead body, or in a tumor excised from the living body, all the resources of the anatomist, aided by the microscope, will occasionally fail in distinctly and surely discovering the true character of the morbid structure.

The most common seats of C. are, among external parts, the female breast, the eye, the tongue, the lip, the male genital organs, and the bones; among internal organs, the liver, stomach, uterus, rectum, gullet, peritoneum, and lymphatic glands. Some of these parts are more liable to primary, others to secondary cancer. Thus, the female breast, the neck of the uterus, the

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lower lip, the scrotum, the extremity of the penis, are very often the seats of a single cancerous tumor, which in its early stage at least seems to be unconnected with any constitutional taint; while the liver, the bones, and the lymphatic glands are more frequently the seats of secondary or multiple cancerous tumors. There are also differences in the character of the C. itself, apart from its anatomical seat, which are to be taken into account in estimating the probability of its being solitary. Some of these differences are regarded by pathologists as amounting almost to specific distinctions; thus, *scirrhus*, or hard C., observed most frequently in the breast, uterus, and stomach, is more frequently solitary than *encephaloid* (brain-like), otherwise called *medullary*, or soft C.; again, *melanosis*, or *melanic* C., a variety charged with a brown or black pigment, is almost always multiple in its occurrence; while *epithelial* C., or *epithelioma*, as it has been recently termed, of which examples are frequently found in the lip, scrotum, penis, or tongue, is so generally solitary as to have led some pathologists to place it in a class altogether apart from the truly cancerous growths, with which, however, its presents too many points of affinity in its fatal tendency to recur after operation, and to infect the lymphatic glands and other structures adjoining the part primarily effected. Again, there are certain varieties of fibrous and of cartilaginous tumor, as well as certain tumors of bone, and bone-like tumors developed in soft parts (osteoid), which must be regarded, in the meantime, as occupying a doubtful position between the malignant and non-malignant growths. (Paget, "Lectures on Surgical Pathology" vol. ii.).

Generally speaking, a tumor may be said to fall under the suspicion of being C. when it more or less completely infiltrates the texture in which it arises, and passes from it into the surrounding textures; when it invades the lymphatic glands adjoining the part first affected; when it is attended by stinging or darting pains, or by obstinate and slowly extending ulceration, not due to pressure; when it occurs in a person having impaired health, or past the middle period of life, and is not traceable to any known cause of inflammatory disease or local irritation, nor to any other known constitutional disease, such as syphilis or scrofula. The probabilities are of course increased if the tumor be in one of the habitual seats of C., or if it be attended by evidence of disease in some internal organ known to be frequently thus affected. But it is hardly necessary to point out that the very complex elements of *diagnosis* here referred to ought to be always submitted to the scrutiny and judgment of a well-educated medical adviser, whose skill and personal character place him above suspicion, before the disease has assumed such a form as to be beyond the reach of remedial procedure. The patient who broods in secret over a suspicion of C., or who declines to apply for advice from a fear of encountering the truth, is in all probability only cherishing the seeds of future suffering; while if, as often happens, the suspicion is unfounded, a few minutes' careful examination would suffice to remove a source of misery which otherwise would poison the mind for years.

These remarks apply still more emphatically to the misguided persons who trust to the non-professional *cancer-curer*, or to the quasi-professional specialist. The charlatan, who pretends to hold in his hands a secret remedy for this most terrible disease, will invariably be found to pronounce almost every tumor C., and every C. curable. By this indiscriminating procedure, and by the fallacious promise of a cure without an operation, many persons who have never been affected with C. at all, have been persuaded to submit to the slow torture of successive cauterisations by powerful caustics, at the expense of needless mutilation and no small risk to life. In other cases, truly cancerous tumors have been removed slowly and imperfectly, at the cost of frightful and protracted sufferings, only to return at the end of a few weeks; and Mr Spencer Wells has lately shewn that in some notorious instances persons were reported as cured, when they had actually died of the disease at no long period after the supposed cure was stated to have taken place. ("Cancer and Cancer-curers," London, 1860).

What is really known as to the cure of C., may be stated in few words. Modern pathological researches render it probable that a complete suspension of the progress of C. sometimes, though rarely, takes place; and individual tumors are found not unfrequently to undergo partial healing, or even to become entirely metamorphosed into inert cicatrices, while others, associated with them, continue

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to advance. The degree of rapidity of the advance of C. is also, we have already stated, exceedingly variable. But these observations modify only to a very slight degree the general doctrine, that C. is a disease tending to a fatal issue, and hardly, if at all, under the control of remedies, as to its ultimate result. The removal of a cancerous tumor, indeed, is still resorted to by surgeons; and there appears to be no reasonable doubt that when performed early, and in well-selected cases, it has been followed by long-continued exemption. But the occasional spontaneous arrest of such growths on the one hand, and the doubtful results of operation in a large proportion of cases on the other, have combined to render surgeons of late years more chary of the use of the knife. In aged persons, in particular, the question often resolves itself into a calculation of the chances of life, founded on a great number of conflicting data, and only to be solved by a careful attention to the state of the general health, as well as to the rate of progress of the local disease. Operations are now very rarely performed after the lymphatic glands are involved, or when there is evidence of a deteriorated constitution, or of internal disease; but sometimes great pain, or profuse and exhausting discharge from an external tumor, may justify its removal, as a palliative measure, even under these unfavorable circumstances. For the mode of removal of cancerous and other tumors, see TUMORS.

Among the lower animals, this disease is more rare; nevertheless, cases are not unfrequent, presenting the same malignant characters as those observed in the human subject. Usually manifesting itself in the form of a specific tumor of some organ or tissue, there is a tendency to the invasion of other parts of the system, and the development of a constitutional state called the cancerous cachexia. M. U. Leblanc of Paris, the best veterinary authority on this subject, has shewn that the dog and cat are most frequently affected with C.; and next in frequency come the pig, ox, horse, and mule. It has not been observed in birds, reptiles, or fishes. Females are more liable to C. than males. It is hereditary, but not transmissible from animals to man, or from one animal to another. It does not disappear under the influence of remedies, but, if possible, the tumors should be excised when first seen, and if the knife fail to extirpate the malady, cauterisation should be had recourse to. A relapse is almost certain; but Leblanc says there is greater chance for the patient, when a carniverous animal, if it is kept on a strictly vegetable diet.

CANCER, the *Crab*, the fourth of the twelve constellations of the zodiac, usually represented on the globe as a crab, and denoted in works on astronomy by a sign which resembles the number 69 laid sideways. It contains, according to Flamsteed, 83 stars, of which the principal is *Acubens*, a star of the third magnitude. In the divisions of the ecliptic, the *sign* called C. occupies a place between 90° and 120° from the vernal equinox; but owing to precession, the sign and the constellation have not coincided for nearly 2000 years. See ECLIPTIC, PRECESSION, ZODIAC. Besides Acubens, it has two stars of the fourth magnitude, called by the Romans *Aselli* or the Little Asses; and a nebulous cluster of minute stars about 2° from the Asses, visible to the naked eye, and which goes by the name of *Præsepe* or the Manger.

CANCER. See CRAB.

CANCER, TROPIC OF. See TROPICS.

CANCER ROOT, or Beech-Drops (*Epiphegus Virginiana*), a parasitic plant of the natural order *Orobanchaceæ* (q. v.), a native of North America, growing almost exclusively on the exposed roots of beech-trees. Like all the other plants of its order, it has a curious appearance, having scales instead of leaves. Its stem is branching, and produces distant alternate white flowers, streaked with purple. The whole plant is powerfully astringent; and the root is brownish, spongy, and very bitter and nauseous in taste. It has acquired, in its native country, the reputation of being a cure for cancer. All parts of the plant are used, and externally more than internally. This plant, in conjunction with white oxide of arsenic, is believed to have formed a medicine once famous in North America under the name of *Martin's Cancer-powder*.—Another American plant of the same order, *Phelipæa bifora*, is sometimes also called C. R., and is used in the same way; and an infusion of the Common Broomrape (*Orobanche major*)—a native of Britain and of the south of Europe, parasitic on the roots of broom, furze, and other leguminous plants—has been employed as a detergent application to foul sores.

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CANCRUM ORIS, known also as *Noma*, *Water-cancer*, and *Water-canker*, is a peculiar form of mortification, arising apparently from defective nutrition. The disease seldom occurs except between the second and eleventh years, and is usually preceded by measles, remittent or intermittent fever, or some other serious disease. The following is the ordinary train of symptoms: more or less general disturbance of the system, accompanied by loss of appetite, followed by swelling of the salivary glands, and a profuse flow of saliva, which escapes from the mouth involuntarily during sleep; ulceration of the gums, which swell and become livid; looseness of the teeth; and the appearance of ash-colored spots on the gums and adjacent mucous membrane, which turn into dark-colored sloughy sores. These sores spread rapidly by a gangrenous process, expose the bone, and finally make a large aperture in the cheek. In some cases, the entire cheek has been destroyed in a few days. Fortunately, this terrible disease is more rare in this country than in some parts of the continent, and most of the cases recorded are described by foreign writers. Van Swieten describes a case in which he saw the first set of teeth fall out, the second set destroyed, the lower jaw exfoliated, and the lips, cheeks, tongue, and chin eaten away before the child died. The obvious indications of treatment are to remove the patient to pure air, to administer tonics, nourishing food, and (in moderation) stimulants; to touch the diseased parts with nitrate of silver, or glyceride of carbolic acid, and to wash out the mouth frequently with a weak solution of Condy's fluid.

CANDAHA'R, or Kandahar, the capital of Central or Southern Afghanistan, situated about 200 miles to the south-west of Cabul. It is in lat. 32° 37′ n., and long. 66° 20′ e., and has an elevation of 3484 feet above the level of the sea. It is in the form of an oblong square, while all its streets run straight, and cut one another at right angles. At the point of intersection there is a large dome (*Charsu*), 50 yards in diameter. Pop. variously estimated from 25,000 to 100,000. C. is well watered by two canals drawn from a neighboring river, which send to almost every street its own adequate supply; and the same means of irrigation have covered the immediate vicinity with gardens and orchards. C. is a place of great commerce, trading with Bombay, Herat, Bokhara, Samarcand, &c. Among its permanent residents, C. has a larger proportion of Afghans, chiefly of the Dooraunee tribe, than any other city of Afghanistan. There are numerous Hindu and Persian merchants. About two miles to the northward rises a precipitous rock, crowned by a fortress impregnable to everything but heavy artillery. Here, amid all the disasters of the Afghan war, the British maintained their ground. C. has been a pivot for the history of Central Asia during more than 2000 years. It is supposed to have been founded by Alexander of Macedon, owing, most probably, its name to the oriental corruption of Iskender or Scander, as in Scanderoon or Iskenderun of Syria. A comparative blank of upwards of 13 centuries in the history reaches to the famous Mahmoud of Ghiznee, who wrested the stronghold from the Afghans. From that epoch down to 1747, when the native rule was permanently established, C., with brief and precarious intervals of independence, was held by Tatary, India, and Persia in turn.

CANDEI'SH, or Khandesh, a collectorate in the presidency of Bombay (lat. 20° 10′—21° 58′ n., and long. 73° 37′—76° 20′ e.), and containing 10,166 sq. m., with a comparatively scanty pop. of (1872) 1,028,642. It lies chiefly in the valley or basin of the middle part of the Tapti, which enters the Gulf of Cambay below Surat; and it is bounded mostly by territories of nearly all the powerful native princes—the Nizam, Scindia, Holkar, and the Guicowar. Through its situation, it necessarily suffered much from the long contest between the Mohammedans and the Mahrattas, and also from the struggles among the rival chiefs of the latter. Accordingly, when, in 1818, it fell to the East India Company, on the overthrow of the Peishwa, it presented little better than a scene of desolation, with ruined mansions, dismantled towns, and dilapidated temples. The difficulties of the new government were considerably aggravated by the Bheels, a more than half-savage race, that formed about an eighth of the population; and even beasts of prey, particularly tigers, had, under the constant influences of human strife, multiplied to an unusual extent. But the improvement was regular and steady. Peace and security reigned; so that roads, formerly hazardous for armed parties, were traversed in safety by unarmed individuals. The staple productions are cotton, wheat, and other grains, and also a little indigo.

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The cultivators are generally in a progressive condition, more especially in the cotton districts, and the well-watered talooka of Baglan.

CANDE'LA, a town of Southern Italy, province of Foggia, 22 miles south of the town of Foggia. Pop. 5600. It is pleasantly situated on the summit of an eminence. The surrounding district is very fertile.

CANDELA'BRUM, a Latin word signifying properly a candlestick (from *candela*, a candle), but more frequently employed to mean a support for a lamp. There were, perhaps, no articles of furniture in which the ancients combined the beautiful with the useful to so large an extent as in their candlesticks and lamps. Candelabra usually stood on the ground, and were of considerable height—from 4 to 8, or even 10 feet. The most common were of wood; but metals of all kinds, including the precious metals, were used for their construction, and sometimes they were even adorned with gems. The candelabra found at Herculaneum and Pompeii are mostly of bronze. In the temples and palaces of the emperors, they were frequently of marble, and of great size and richness. They have usually a capacious cup at the top, either for the purpose of containing oil enough to feed a large flame, or that they might be used for burning incense. Though varying greatly in details, a general design runs through the forms of the candelabra of antiquity. They have all a foot or feet, a shaft, and a plinth on which a lamp is placed, or which is furnished with a socket for a candle. The base often consists of three feet of a lion, goat, griffin, or other animal real or imaginary. Sometimes a figure was introduced either into the body of the shaft, or placed on the top of it, in either case supporting the superincumbent portion of the C. on its head. Sometimes a figure was substituted for the shaft altogether, the receptacle for the oil being placed in one hand. In others, the shaft is a sliding one, like that of a music-stand, the object being, of course, to raise or depress the light at pleasure.

In addition to the various kinds of candelabra which, from their height, seem to have stood on the floor, the ancients had others intended to be placed on a table. These consisted either of a pillar or of a tree, and from the capital of the former, or the branches of the latter, lamps were suspended.

CA'NDIA, in Turkish, "KIRI'D," called in the most ancient times *Idæa*, afterwards *Crete*, one of the largest islands of the Mediterranean, is situated at the entrance of the Archipelago, in long. 23° 40'—26° 40' e. lat. 34° 50'—35° 55° n. It is very irregular in form, its length being about 160 miles, and its breadth varying from 6 to 35 miles. The history of C. commences with Greek mythology, and historians and poets say that it was governed by its own kings, among whom were Saturn, Jupiter, and Minos, 1800 years before Christ. C. was conquered by the Romans under Metellus, who, on that account, had the title of "Creticus;" on the division of the empire, it fell to the share of the eastern monarchs. In 823 A. D., it was conquered by the Saracens, who built the city of C. on the ruins of Heraclea. In 1204, it was sold by Pope Boniface—to whom Baldwin I. gave it—to the Venetians. In 1645, the Turks besieged Canea, and in 1669 conquered the island, after a war, which lasted 24 years. The Cretans sigh for a union with Greece, and have repeatedly risen in insurrection against Turkish rule, notably in 1866. At the Berlin Congress in 1878, the Porte engaged scrupulously to carry out in C. the reformed system of government drawn up in 1868.

The island of C. is for the most part mountainous, the mountains being chiefly composed of freestone or of marble, which is either gray or white. Towards the south side of the western part of the island, there is a chain of high mountains, extending in length about 37½ miles, which, from their appearing white, especially at their west end, were anciently called Leuci. Mount Ida, now called by the natives Upsilorites, is one in a chain of mountains extending to the north-west of the island almost to Retimo; the mountain is of gray marble, and the surface loose stones: there is no verdure on it except a few small shrubs. Jupiter is said to have passed great part of his youth amongst these mountains in the exercise of hunting and drawing the bow.

The island abounds in springs and fountains, which are found even by the seaside; most of the rivers are dry in summer, but in winter many of them are very dangerous torrents. The island does not produce any minerals of importance. The soil of C. is fertile, and produces wheat in abundance. The exports, which consist

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chiefly of oil, wool, linseed, and fruit, amount in annual value to above £400,000, and the imports to about £440,000.

C. had once, according to Homer in his "Odyssey," 90 cities; there are now only 3 principal towns: Megâla Kástron or Candia, pop. 15,000, of which 5000 are Christians; Retimo or Rhithymnoe, pop. 6000, of which 2000 are Christians; Canea or Khania, pop. 12,000, of which 8000 are Christians. The total population of the island now numbers little more than 200,000—less than half its amount at the outbreaking of the Greek revolution in 1821.

The population is for the most part of Greek descent; there are only about 70,000 Turks, with a few Arabs and Armenians, in the island. There are, however, many Greek Moslems in C., the worldly advantages which used to result from embracing Islamism having induced whole districts to abandon the faith of their forefathers; but their change of religious faith was unaccompanied by any change of language.

CANDIDATE (Lat. *candidatus*). Among the Romans, a suitor for the office of consul, quæstor, prætor, &c., was named C. because, in appearing before the people, he wore a white (*candida*) toga without a tunic. His dress was chosen partly as an ostentation of humility, and partly as it served to display wounds received in battle. The candidature commonly lasted two years: in the first year, the C. was proved by the senate, whose decision, if favorable, was ratified by the popular assemblies; and, in the second, his name was entered in the list of candidates. During this period occurred the *ambitio*, or canvassing of voters, which often gave occasion to enormous bribery, in spite of the severe enactments passed to prevent the corruption of the electors. The elected C. was styled *Designatus*.

In the early Christian Church, newly baptised converts were styled CANDIDATES, on account of the white garments worn during eight days after baptism. In modern times, a German probationer or theological student who had been approved before the highest ecclesiastical authorities, is called a C.; but a still broader signification is also attached to the word, an applicant for any office whatever, religious or secular, being termed a candidate.

CANDLE, a cylinder of wax or fatty matter, with a wick, intended for giving light. Candles are made principally of tallow; also of the solid portion of palm and cocoa nut oils, bleached wax, spermaceti, and paraffin, and other oily substances found in coal, shale, and gas-tar. They are either dipped, moulded or rolled. "Dips" are made by stretching a number of wicks upon a suitable frame, so that they may hang down at a distance from each other equal to about double the intended thickness of the C.; these are then dipped in a trough of melted tallow, and hung upon a rack until cooled, then dipped again and again, until the required thickness is obtained. The dipper has a number of frames prepared before commencing, and by the time he has dipped the last, the first is cool enough to dip again. The tallow in the trough has to be kept only a little above its melting point, for if it were much hotter, it would melt away a portion of the tallow already on the wick, instead of adding to it. Tallow-candles are much improved by being kept a year or a winter before using.

Moulds, or mould-candles, are cast by pouring the tallow down a pewter tube, along the axis of which the wick has been previously fixed. These tubes are well polished on the inside, and several are fitted in a frame, the upper part of which forms a trough, into which the moulds all open; thus, by pouring into the trough, all the moulds are filled at once.

Wax-candles are not moulded, on account of the great amount of contraction which wax undergoes in cooling, and the difficulty of drawing it from the moulds. The wicks are warmed, and suspended over a basin of melted wax, which is poured over them until they acquire the proper thickness; they are then rolled, while hot, between two flat pieces of smooth hard wood, kept wetted to prevent adhesion.

Great improvements have recently been made in the manufacture of candles, and these are especially interesting from being the direct results of the progress of scientific chemistry—of theory applied in practice. All oils or fats are composed of one or more fatty acids combined with a base, called glycerine. The fatty acids constitute the combustible and more solid portion of the compound. Both acid and base are very weak, and it is a general law in chemistry, that a strong base, under

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favorable conditions, will separate a weaker one from its acid, by combining with the acid, and taking the place of the weak base; and a strong acid will in like manner displace a weaker one. Lime is a strong base, and being cheap, is used to separate the glycerine from the fatty acid of tallow, palm oil, etc. This it does when the melted fat is stirred for some hours with a mixture of lime and water. The lime forms a hard insoluble soap, by combining with the fatty acid, and the glycerine remains in solution with the water. This lime-soap is then broken to powder; and the weak fatty acid separated by means of sulphuric acid, which combines with the lime, forming sulphate of lime. The whole being heated, the fatty acid floats on the top, is skimmed off, and the candles made from it. These are called composite candles; they give a purer light than ordinary tallow, from being freed from the glycerine, which not only softens the fat, but diminishes its combustibility. Pure stearic acid, or stearine, the chief fatty acid of tallow, is a hard crystalline substance, perfectly dry, and free from any greasiness, with a somewhat pearly lustre. Its crystalline structure presents a difficulty in the manufacture of candles, for when cast in moulds, it contracts on cooling, and leaves small spaces between the crystals. This has been obviated by mixing a little arsenic with it; but this method is now abandoned, on account of the poisonous gas evolved by the combustion of such candles, and the desired effect is obtained by mixing the stearine with a little wax, and pouring it into hot moulds.

To obviate the necessity of snuffing candles, several contrivances have been adopted; in all of them, the object is effected by causing the wick to bend over and its end to fall outside of the flame, and thus, by coming in contact with the oxygen of the air, to be completely burned—for such combustion cannot take place within the flame. See FLAME. This bending over is variously brought about. One method is by twisting the wick with one strand shorter than the rest, which is strained straight while the candles are being cast; and when released by the melting of a portion, it contracts, and bends the wick. Another method is by adding on one side of the wick a paste, consisting of a mixture of borax, bismuth, flour, and charcoal. Another, by coating one of the threads of the wick with a metallic envelope, by dipping it in fused bismuth; the metal fuses at the end of the burning wick, and forms a small globule, which bends the wick over, and is itself readily combustible at a red heat. These are called *metallic* wicks. Various other contrivances have been adopted for the same object. Price's manufactory of "patent" candles, as these improved candles usually are called, is perhaps the largest in England. It is situated at Vauxhall, in the neighborhood of London, and its economic arrangements have attracted not a little public attention. *Paraffin* (q. v.), a white crystalline body, obtained by distillation from cannel coal, &c., affords a beautifully white and clear material for candles, and having thus in a great degree the properties of wax at a much smaller expense, it has lately been much used for this purpose. *Ozokerit* is another oily mineral substance used for candles.

Candles were early introduced—with symbolical signification—into Christian worship, and are still so employed in the Roman Catholic Church. In the Church of England, candles are sometimes placed on the altar; but the practice is a subject of controversy. The numerous superstitious notions and observances connected with candles and other lights in all countries had a more remote origin, and may be considered as relics of the once universally prevalent worship of the sun and of fire. Numerous omens are taken from them, and they are also used as charms. In Britain, a portion of the tallow rising up against the wick of the candle, is called a winding-sheet, and regarded as a sure omen of death in the family. A bright spark at the candle denotes that the party directly opposite is to receive a letter. Windy weather is prophesied from the waving of the flame without visible cause, and wet weather if the wick does not light readily. Lights appearing to spring up from the ground, or issue out of a house, and traverse the road or air by invisible agency, the superstitious in Wales and elsewhere call *corpse-candles*. They are ominous of death, and their route indicates the road the corpse is to be carried for burial. The size and color of the light tell whether the fated person is young or old. It is or was customary in some places to light a candle, previously blessed, during the time of a woman's travail. C. were supposed to be efficacious after death as well as before birth, for they were placed on the corpse. The object was doubtless to ward off evil spirits,

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who were supposed to be always on the alert to injure souls on entering and on quitting the world. See also CANDLEMAS.

CA'NDLEBERRY, Candleberry Myrtle, Wax Tree, Wax Myrtle, Tallow Tree, or Bayberry (*Myrica cerifera*), a small tree or shrub of 4—18 feet high, but generally a low spreading shrub, a native of the United States of America, but most abundant and luxuriant in the south. It belongs to the natural order *Amentaceæ*, sub-order *Myriceæ*, according to some, a distinct natural order, distinguished by naked flowers, with 1-celled ovary, a drupaceous fruit (stone-fruit)—the scales becoming fleshy—and a single erect seed. The genus *Myrica* has male and female flowers on separate plants; and the scales of the catkin in both male and female flowers are concave. The C. has evergreen oblongolanceolate leaves, with two small serratures on each side at the point, sprinkled with resinous dots. The bark and leaves when bruised emit a delightful fragrance. The drupes—popularly called berries—are about the size of peppercorns, and when ripe, are covered with a greenish-white wax, which is collected by boiling them and skimming it off, and is afterwards melted and refined. A bushel of berries will yield four or five pounds. It is used chiefly for candles, wich burn slowly with little smoke, and emit an agreeable balsamic odor, but do not give a strong light. An excellent scented soap is made from it.—*M. Gale* is the SWEET GALE of the moors and bogs of Scotland, well known for its delightful fragrance, a native of the whole northern part of the world. Several species are found at the Cape of Good Hope, one of which, *M. cordifolia*, bears the name of WAX SHRUB, and candles are made from its berries.

CANDLE-FISH, or Eulachon (*Thaleichthys Pacificus*), a remarkable fish of the family *Salmonidæ* nearly allied to the Capelin (q. v.), and, like it, strictly a sea-fish, approaching the coasts to spawn, but not entering rivers. The C. inhabits the Pacific Ocean, near the western shores of America, from Vancouver's Island northwards. It is not larger than a smelt, has a somewhat pointed and conical head, a large mouth, teeth on the pharyngeals, and the tongue rough, but the lower jaw, palatines, and vomer destitute of teeth. The color is greenish olive on the back, passing into silvery white on the sides and belly, sparsely spotted with dirty yellow. It is probably the fattest or most oleaginous of all fishes, or indeed of animals, and is used by the Indians not only as an article of food, but for making oil. To broil or fry it, is nearly impossible, because it almost completely melts into oil. Indeed, the Indians often use it, in a dried state, as a lamp for lighting their lodges, merely drawing through it a piece of rushpith, or a strip from the inner bark of the "Cypress Tree" of these regions, *Thuja gigantea*—a species of Arbor Vitæ—as a wick, a long needle of hardwood being used for this purpose; and the fish being then lighted at one end, burns steadily until it is all consumed. In order to use the dried fish for food, the Indians often melt it into oil, by the application of heat, and drink the oil. It is also eaten uncooked. Drying is accomplished without any gutting or cleaning, the fish being fastened on skewers passed through the eyes, and hung in the thick smoke at the top of sheds in which wood-fires are kept burning. They soon acquire a flavor of wood-smoke, and the smoking helps to preserve them. They are then stowed away in large frails, made from cedar-bark or rushes, in order to be used for food in winter. Immense shoals of C. approach the shores in summer, and are caught in moonlight nights, when they come to sport at the surface of the water, which may often be seen glittering with their multitudes. The Indians paddle their canoes noiselessly amongst them, and catch them by means of a monster comb or rake—a piece of pine-wood from six to eight feet long, made round for about two feet of its length at the place of the hand-gripe, the rest flat, thick at the back, but having a sharp edge in front, where teeth are driven into it about four inches long, and an inch apart. These teeth are usually made of bone, but the Indian fishers have learned to prefer sharp iron nails when they can get them. One Indian, sitting in the stern, paddles the canoe; another, standing with his face to the bow, holds the rake firmly in both hands, the teeth pointing sternwards, sweeps it with all his force through the glittering mass, and brings it to the surface teeth upwards, usually with a fish, and sometimes with three or four, impaled on each tooth. This process is carried on with wonderful rapidity. When a sufficient quantity of C. has been dried for winter, the rest that are caught are made into oil, being, for this purpose, piled in heaps until partially decomposed, and then

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placed in large, square, pine-tree boxes; a layer about three deep in the bottom of each box, covered with cold water, and a layer of hot stones put in, then a layer of small pieces of wood, another layer of fish, stones, and so on. The oil is skimmed from the surface of the water in the boxes. A vast quantity of oil is thus obtained. The C. is an excellent article of winter food in a climate of which the winter is severe; and, notwithstanding its excessive fatness, is of agreeable flavor. It has not yet become an article of economical value to the civilized inhabitants of North-western America, but seems very likely to do so, and to acquire a very considerable commercial importance.

CA'NDLEMAS, in its ecclesiastical meaning, is the feast of the Purification of the Virgin Mary, and is observed on the 2d of February. This festival is very strictly kept by the Roman Catholic Church, there being a procession with many lighted candles, and those required for the service of the ensuing year being also on that occasion consecrated; hence the name Candlemas Day. In Scotland, this day is one of four term-days appointed for periodical annual payments of money, interest, taxes, &c., and of entry to the premises—the three other term-days there being Whit-sunday, Lammas, and Martinmas. See TERM.

An old document of the time of Henry VIII., preserved in the archives of the Society of Antiquaries, London, concerning the rites and ceremonies in the English Church, speaks thus of the custom of carrying candles: "On Candlemas Daye it shall be declared that the bearyinge of candels is done in memorie of Christe, the spirituall lyghte whom Simeon dyd prophecye ['a light to lighten the Gentiles'], as it is redde in the churche that daye." But an older and heathen origin is ascribed to the practice. The Romans were in the habit of burning candles on this day to the goddess Februa, the mother of Mars; and Pope Sergius, seeing it would be useless to prohibit the practice of so long standing, turned it to Christian account by enjoining a similar offering of candles to the Virgin. The candles were supposed to have the effect of frightening the devil and all evil spirits away from the persons who carried them, or from the houses in which they were placed. An order of council in 1584 prohibited the ceremony in England. There is a tradition in most parts of Europe to the effect that a fine C. portends a severe winter. In Scotland, the prognostication is expressed in the following distich:

"If Candlemas is fair and clear,
There 'll be twa winters in the year."

Christ's Presentation, the Holiday of St Simeon, and, in the north of England, the Wives' Feast-day, were names given to Candlemas Day. See Brand's "Popular Antiquities," Bohn's edition.

CA'NDLE-NUT (*Aleurites triloba*), a tree of the natural order *Euphorbiaceæ* (q. v.), a native of the South Sea Islands, Madagascar, Molucca, Java, &c., which produces a heart-shaped nut with a very hard shell, and a kernel good to eat when roasted, although in a raw state it possesses in a slight degree some of the active properties so common in the *Euphorbiaceæ*, and is apt to cause purging and colic. It is about as large as a walnut. An excellent bland oil is procured from it, used both for food and as a lamp-oil. The inhabitants of the Society Islands after slightly baking these nuts in an oven, and removing the shell, bore holes through the kernels, and string them on rushes, hanging them up in their houses, to be used for torches, which are made by enclosing four or five strings in a leaf of the screw-pine (*Pandanus*). These torches are often used in fishing by night, and burn with much brilliancy. The lampblack used in tattooing was obtained from the shell of the candle-nut. A gummy substance exudes from the C. tree, which the Tahitians chew.

CA'NDLESTICK. The ordinary C. is so well known that no description is needed. The most important modern improvement in the C., is a contrivance for maintaining the candle at a uniform height, by means of a spring placed below the candle, and confined in the cylindrical body of the C.; this spring presses the candle upwards with sufficient force to drive it completely out, but for a collar at the top, against which the surface around the wick bears, and thus, as the candle melts, it yields to the pressure of the spring, and maintains a uniform height. The collar, when properly adjusted, also prevents the guttering to which composite candles are liable when exposed to currents of air or moved about.

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CANDLISH, Robert Smith, D.D., an eminent Scottish divine, was born in Edinburgh in 1806, entered the university of Glasgow in 1822, and was licensed as a preacher in connection with the Established Church in 1828. In 1834 he became minister of St George's, Edinburgh. From this period, his public career may be said to have commenced. With intense zeal, he advocated the justice and necessity of ecclesiastic reforms, and became one of the boldest and most vigorous leaders of the popular or "non-intrusion" party. After the disruption (see FREE CHURCH), he co-operated with Dr Chalmers and other chiefs of the newly formed denomination in organising, consolidating, and extending its aggressive efforts. In 1845–1846, he took an active part in the establishment of the Evangelical Alliance. In 1847, he was, when Dr Chalmers died, appointed to the chair of Divinity, in the New College, Edinburgh, but did not assume the functions of this office. In 1862, he was appointed Principal of the same college. He died Oct. 19, 1873. His best known teachings through the press are "Contributions towards the Exposition of the Book of Genesis;" "The Atonement, its Reality and Extent;" "An Examination of Mr. Maurice's Theological Essays;" "The Fatherhood of God;" and an "Exposition of the First Epistle of St John."

CA'NDY. See CEYLON.

CA'NDYS (Gr.), a loose gown, worn by the Medes and Persians over their other garments. It was made of woollen cloth, which was either purple or of some other brilliant color, and had wide sleeves. In the sculptures at Persepolis, nearly all the personages are represented as so attired. A gown of a very similar kind is still worn by Arabians, Turks, and other orientals.

CANDY-SU'GAR is the popular name applied to ordinary sugar when procured in large crystals by the gradual and slow cooling of a concentrated solution of sugar. See SUGAR.

CA'NDYTUFT (*Iberis*), a genus of plants of the natural order *Cruciferæ*, distinguished by unequal petals, the largest being towards the circumference of the dense corymbs in which the flowers grow, and by an emarginate pouch with the valves keeled and winged, the cells one-seeded, and the cotyledons accumbent. See COTYLEDON. The species are chiefly found in the countries surrounding the Mediterranean Sea, and the name C. is supposed to be derived from that of the island of Candia, the name *Iberis* from Iberia (Spain). One species, *I. amara*, remarkable for its bitterness, is a doubtful native of England. Some species are slightly shrubby, some are herbaceous perennials, some annuals. Some are among the most familiar ornaments of our flower-gardens, as the annual White and Purple C. (*I. umbellata*), the Sweet-scented C. (*I. odorata*), and two slightly shrubby species, *I. sempervirens* and *I. semperflorens*, the latter of which, in favorable situations, continues to blossom throughout the whole winter, and pleases the eye at all seasons, both by the abundance and the perfect whiteness of its flowers.

CANE, or Ken, a river rising in Bundelcund, near lat. 23° 54′ n., and long. 80° 18′ e., and, after a north-north-east course of 230 miles, entering the Jumna in lat. 25° 47′ n., and long. 80° 35′ e. It is too rapid and rugged for navigation; and is remarkable for the matchless beauty of its pebbles.

CANE, a term sometimes indiscriminately applied to any small and smooth rod, of the thickness of a walking-stick or less; but more correctly limited to the stems of the smaller palms and the larger grasses. We thus speak of Sugar C., Bamboo C., &c., among the latter; whilst among the former, this name is particularly appropriated to the species of the genus *Calamus*, also called Rattan. To this genus belong the canes largely imported from the tropical regions of the east for making bottoms of chairs, couches, &c. See RATTAN.

CANE SUGAR. See SUGAR.

CANE'A, or Ca'nna, called *Khania* by the Greeks, is the chief commercial town of Candia or Crete, and is capital of a province. It is situated on the northern coast, and occupies the site of the ancient Cydonia. The present city is of Venetian origin, and dates from 1252 A.D., when a colony was sent from Venice to occupy it. The object of its foundation was to keep down the Greeks, who had been in arms, and at open war with their Italian lords almost without intermission from the day when the Venetians first set foot on their shores. Venetian coats of arms are still

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observed over the doorways of some of the principal houses. C. is surrounded by a strong wall and deep ditch, both of which, however, are in a state of great dilapidation; it has a good but very shallow harbor. C. is the principal mart for Candian commerce, and exports to France and Italy, oil (530 tuns in 1874), soap (50,000 cwts. in 1874), wax, &c. Several consuls are here stationed, and it is the residence of the Turkish governor of the province, and of the Greek bishop. Pop. 12,000, of whom ⅔ds are native Greeks; the rest mainly Turks. The language spoken is modern Greek. The environs of C. are very beautiful.

CA'NE-BRAKE (*Arundinaria macrosperma*), a large kind of reed or grass, indigenous to the warmer parts of the United States of North America. It grows in marshy situations. It is of a genus allied to the bamboo. The flowers are in panicles.

CANE'LLA (*Canella alba*), a small tree common in the West Indies, where it is often called WILD CINNAMON. Its place in the botanical system has not yet been exactly ascertained, but it seems to be allied to *Pittosporaceæ*. The fruit is a small black berry. The whole tree is very aromatic, and its flowers are extremely fragrant. The bark of the young branches is the *C. Bark* of apothecaries, also known in commerce as *White-wood Bark*, and sometimes called *White Cinnamon*. It forms a considerable article of export from the Bahamas. It has an aromatic fragrance, regarded as intermediate between that of cinnamon and that of cloves, and a bitterish, acrid, pungent taste. It is employed as a stomachic and stimulant tonic, and as an aromatic addition to tonics or to purgatives, in debilitated conditions of the digestive organs.

CA'NÉS VENA'TICI (Lat. Hunting Dogs), a constellation of the northern hemisphere, added by Helvetius, and known generally as the greyhounds of Helvetius. The dogs are distinguished by the names of Asterion and Chara. On the celestial globe, they are represented as being held in leash by Bootes, and apparently pursuing Ursa Major (q. v.) round the pole of the heavens.

CANG, Canque, or Kea, an instrument of degrading punishment in use in China. It consists of a large wooden collar fitting close round the neck, and the weight of which is usually from 50 to 60 pounds. Over the parts where the C. fastens are pasted slips of paper, on which the mandarin places his seal, so that the culprit may not be relieved until the full term of his sentence has expired, which sometimes extends to 15 days. On the C. is also inscribed, in large letters, the offence and duration of the punishment. The criminal having been paraded through the streets by the police, is then left exposed in some thoroughfare of the city. As he is incapable of using his hands, he has to be fed during the time he is suffering the penalty.

CA'NGAS DE O'NIS, a town of the Asturias, Spain, about 35 miles east-south-east of Oviedo. It is a poor place, but in its vicinity are one or two interesting monastic structures, and the cave whence the Goths fled and hid themselves, after the battle of Guadalete, in 711, and from which, in 718, they issued, and annihilated the Moorish invaders. Pop. 7000.

CANICA'TTI, a town of Sicily, in the province of Girgenti, and 15 miles east-north-east of the city of that name. It is situated on the banks of the Naro, is well built, and has sulphur mines. The inhabitants (1872) 20,908 in number, are principally engaged in agricultural pursuits.

CANI'CULAR, Canicular Days, or Dog-days, Canicular Year. Canicular was an old name of Canis Minor (q. v.); it was also used to denote Sirius, or the Dog-star, the largest and brightest of all the stars, and which is situated in the mouth of Canis Major (q. v.). From the Heliacal Rising (q. v.) of this star (Sirius), the ancients reckoned their dog-days, or *Dies Caniculares*, which were 40 in number—20 before, and 20 after the rising of the star. The rising of the dog-star was in ignorance supposed to be the occasion of the extreme heat and the diseases incidental to these days. It was by mere accident that the rising of the star coincided with the hottest season of the year, in the times and countries of the old astronomers. The time of its rising depends on the latitude of the place, and is later and later every year in all latitudes, owing to precession. In time, the star will rise in the dead of winter. The Canicular Year was that known among the Egyptians and Ethiopians. It was computed from one rising of Sirius to the next,

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and consisted ordinarily of 365 days, and every fourth year of 366. This year was sometimes called the Heliacal Year. The reason for computing the year from the rising of Sirius, seems to have been that, at the time, the heliacal rising coincided with the greatest swelling of the Nile.

CA'NIDÆ (Lat. *canis*, a dog), a family of the Digitigrade (q. v.) section of carnivorous mammalia, which, as now generally defined, is less extensive than the Linnæan genus *Canis*, the hyænas being excluded from it, and referred to the family *Viverridæ* (civets, ichneumons, &c.). These families are, indeed, closely connected, and hyænas may be said to form a connecting-link between them, the dentition, however, making a nearer approach than in either of them to that of the cats or *Felidæ*.—The C. have two flat tuberculous molar teeth or grinders on each side, behind the great carniverous cheek-tooth—the last præmolar—of the upper jaw, a dentition resembling that of the bear family, or *Ursidæ*, to which they exhibit a further resemblance in their power of adapting themselves to the use of vegetable food. Their whole organisation fits them to be less exclusively carniverous than the feline tribe. They have generally three incisors or cutting teeth, with one large canine tooth, and four præmolars on each side in each jaw, two true molars on each side in the upper jaw, and three in the lower. The true molars are adapted for crushing either bones or vegetable food. The last præmolars in the upper jaw are remarkably large, and particularly adapted for cutting flesh. See DOG, FENNEC, FOX, JACKAL, LYCAON, WOLF, &c.

CA'NIS MA'JOR, the *Greater Dog*, a constellation of the southern hemisphere, below the feet of Orion. It contains Sirius, the brightest of all the stars, and its place may be found by means of this star, which is on the continuation of the line through the belt of Orion. According to Flamsteed, it contains 31 stars.

CA'NIS MINOR, the *Lesser Dog*, is a constellation of the southern hemisphere. It is near Canis Major, and just below Gemini. Procyon, of the first magnitude, is its principal star, and lies in a direct line between Sirius and Pollux; so that the position of the constellation may be found by means of this star. According to Flamsteed, it contains in all 14 stars.

CA'NISTER SHOT. See CASE SHOT.

CA'NKER, a disease of plants, especially fatal to fruit-trees in many gardens. It is a kind of gangrene, usually beginning in the young shoots and branches, and gradually proceeding towards the trunk, killing the tree in the course of a few years. Wet subsoils seem in many cases to induce it, and it begins most readily in shoots that have been imperfectly ripened and injured by frost, or which have received some accidental wound. Those varieties of fruit-trees which have been long propagated by grafting and budding are most liable to it. It is sometimes cured by *heading down* the tree, and causing it to throw out new branches.

CANKER, a vague term applied to various diseases of the lower animals, characterised by their chronic nature, and consisting chiefly in ulceration, suppuration, and the development of fungoid excrescences in the parts affected.

CANKER, in the foot of the horse. This malady, believed by Gerlach of Berlin to be truly cancerous, is observed in two different forms: in the acute stage, when the malady is chiefly local; and in the chronic stage, when the constitution suffers, and all local remedies fail to restore a healthy function of the structures of the foot.

Symptoms.—It usually commences by discharge from the heels, or the cleft of the frog of the horse's foot. The horn becomes soft and disintegrated, the vascular structures beneath become inflamed, and the pain which the animal endures is intolerable. It is therefore very lame on one, two, or all feet, according to the number affected. Though there is no constitutional fever, the horse becomes emaciated, and unfit for work. During wet weather, and on damp soil, the symptoms increase in severity. The sore structures bleed on the least touch, and considerable fungoid granulations, commonly called proud flesh, form rapidly.

Causes.—This disease is occasionally hereditary, and it is most frequently seen in low-bred draught or coach horses. Dirt, cold, and wet, favor the production of the disease, and there is always a tendency to relapse when once an animal has been affected.

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Treatment.—Pare away detached portions of horn, and, in mild cases, sprinkle powdered acetate of copper over the sore; apply over this pledgets of tow, fixed over the foot by strips of iron or wood passed between shoe and foot. In severe cases, tar and nitric acid, creasote and turpentine, chloride of zinc paste, and other active caustics, have to be used for a time with the regular employment of pressure on the diseased surface. The animal requires to be treated constitutionally by periodical purgatives and alteratives. Good food, fresh air, and exercise often aid much in the treatment of the disease.

CA'NNA, one of the islands of the Hebrides, off the west coast of Scotland, 7 miles south-west of Skye, and 8 miles north-west of Rum. It belongs to Argyleshire, and is 4¼ miles long from east to west, and 1 mile broad. The surface stands high above the sea, and consists of trap (claystone, porphyry, and trap conglomerate, with fragments of old red sandstone and bituminous wood), which has overflowed thin laminæ of coal and shale. The island has a hill of basalt, called Compass Hill, which reverses the magnetic needle. Pop. (1871) 48.

CANNABINA'CEÆ, a natural order of Dicotyledonous plants, or, according to many, a sub-order of URTICACEÆ (q. v.), differing from the proper *Urticaceæ* chiefly in the suspended exalbuminous seed, and hooked or spiral embryo. But only two plants of the order or sub-order are known, both of them valuable, HEMP (q. v.) and the HOP (q. v.).

CA'NNÆ (ancient *Cannæ*), a town of Southern Italy, in the province of Bari, 8 miles west-south-west of Barletta, not far from the mouth of the Ofanto, formerly the Aufidus. It is celebrated on account of the great victory here gained by Hannibal over the Romans in the summer of 216 B. C. Hannibal crossed the Aufidus at a ford, and attacked the Romans, who in a short time were almost annihilated by the terrible Numidian cavalry. Among those left on the field were Paulus Æmilius, the consul of the previous year; Minucius, the late Master of the Horse; and a vast number of Roman knights. The loss of the Romans is stated by Livy at 45,000 infantry and 8000 cavalry. As Hannibal lost in the battle 8000 men, he did not think it prudent to follow the advice of Maharbal, and advance rapidly on Rome. Twenty thousand Romans were made prisoners, partly on the field of battle and partly in the camp.

CANNES, a seaport town of France, in the department of Alpes-Maritimes, pleasantly situated on the Mediterranean, on the road to Nice. It is famed for its salubrity, which has induced a number of English families to make it a winter residence. Lord Brougham used to occupy a fine villa here. Latterly, the town has been much improved. It has fisheries of anchovies and sardines, and a trade in the produce of the district. After his escape from Elba, Bonaparte landed about a mile and a half to the east of C., March 1, 1815. Pop. (1876) 13,519.

CA'NNIBAL (derived from a variety in the spelling of Caribs, the original inhabitants of the West India Islands, who were reputed to be man-eaters, and some tribes of whom, having no *r* in their language, pronounced their names (*Canib*), means, like the Greek word *anthropophagos*, which is often used instead of it, one who feeds on human flesh. The practice is often attributed by classical and early Christian writers to races whose practices they denounce as abominable; but the denunciation is often better evidence of the abhorrence of cannibalism by those making the accusation than of its practice by the accused. Homer makes Polyphemus eat men, but only as one of his other unnatural attributes as a monster. The early Christian writers frequently attributed cannibalism to the unconverted. St Jerome gives his personal testimony to the practice, stating that when he was a little boy living in Gaul he beheld the Scots—a people of Britain—eating human flesh, and though there were plenty of cattle and sheep at their disposal, yet would they prefer a ham of the herdsman or a piece of female breast as a luxury. Statements in old authors still more absurd induced some thinkers to believe that cannibalism is unnatural, and to deny that it was ever practised by human beings except under the pressure of starvation. The accurate observation of late travellers has, however, put it beyond doubt that cannibalism has been and is systematically practised. Comte, as part of his system of positive philosophy, accepting of cannibalism as a condition of barbarism, main-

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tains that the greatest step in human civilization was the invention of slavery, since it put an end to the victor eating the vanquished. The facts, however, which we possess, shew that the people systematically addicted to human flesh are not the most degraded of the human race. For instance, in the Australian continent, where the larger animals are scarce, the people, who are of an extremely degraded type, feed on worms and herbs, and have only been known in casual and exceptional conditions to feed on human flesh. The New Zealanders, on the other hand, who are the most highly developed aboriginal race with which late European civilization has had to compete, were, down to a late period, systematic feeders on human flesh, despising the inefficient food which satisfied the natives of Australia. In Angas's "New Zealand Illustrated," there is a picture of the country mansion of the accomplished chief Rangihaeta, "one of the finest specimens," says the author, "of elaborately ornamented dwellings yet extant." Its name is Kai Tangata, which means Eat man; and it had been so called in pleasing memorial of the feasts held within its walls. It has been supposed that the reason why, among the Jews and several eastern nations, the eating of swine's flesh was forbidden as an unclean food, was its resemblance to human flesh, and the danger that persons accustomed to the one might not retain their abhorrence of the other. In the Crusades, the Saracens charged their Christian enemies with eating unclean food, including flesh of men and of swine. In the old romance of Richard Cœur de Lion, he is represented, on recovering from sickness, as longing for a piece of pork; but that not being procurable, a piece of a Saracen's head was substituted for it, and pronounced by him to be infinitely more palatable. There have been many sad instances where people who naturally had a horror of such food, have been driven by starvation to eat human flesh—as in sieges and shipwrecks. Besides these instances, however, and the systematic cannibals, there is no doubt that people not otherwise habituated to the practice, have been excited by ferocity and revenge to eat, and with relish, the flesh of enemies. In many of the cannibal countries, only the flesh of enemies is consumed. As an instance that this is a natural development of ferocity in degraded natures, we may take the fate of the Princess Lamballe in the French Revolution, whose heart was plucked out by one of the savages of the mob, taken to a restaurant, and there cooked and eaten by him. The great Highland chief, Sir Ewen Cameron of Locheil, in a death-struggle with an English trooper, killed him by biting a piece out of his throat, and used to say it was the sweetest morsel he had ever tasted.

CANNING, George, a distinguished British statesman and orator, was born in London, April 11, 1770. His father, who was descended from an ancient family, incurred the displeasure of his relatives for marrying beneath his station, and died in poverty when his son was only a year old. His mother (who for a subsistence tried the stage, with but little success, married an actor, and subsequently a linen-draper) lived to rejoice in the success and participate in the good fortune of her boy, whose education was liberally provided by an uncle. C. was first educated at Eton, from which he passed, at the age of 17, to Christ's Church College, Oxford, where he greatly distinguished himself, especially in classics. While here, he cultivated the friendship of the Hon. Charles Jenkinson (afterwards Lord Liverpool), who was of considerable service to him in after life. From Oxford he went to Lincoln's Inn, but on the suggestion of Burke, as it is said, he soon relinquished the bar for a parliamentary career. He entered the House for Newport, Isle of Wight, in 1793, as the protégé and supporter of the minister Pitt. In 1796, he was appointed an under-secretary of state. It was not, however, until 1798 that C. made a reputation as an orator and a statesman by his speeches in favor of the abolition of the slave-trade, and against Mr Tierney's motion regarding peace with the French Directory, the latter of which, especially, was regarded as a master-piece of eloquence, alike by the House and the country. In the debates on the Habeas Corpus Suspension Act, the union with Ireland, and other important questions, C. gave valuable assistance to the ministry, not only by his voice in parliament, but by his pen in a satirical paper, called the "Anti-Jacobin," in which he especially lashed the "New Philosophy," as it was called, promulgated by the French republicans. "The Knife Grinder" is one of the best known and happiest of his efforts in this line. In 1801, Pitt resigned office, and C. joined the opposition against the Addington ministry. When Pitt again became premier in 1804, C. was made

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treasurer of the navy, an office which he held until Pitt's death in 1806. His opposition to the short-lived Grenville ministry which succeeded, savored of the bitterness of party feeling, and his treatment of Fox in his last days, and of his memory after his death, was far from generous. When the Portland ministry was formed in 1807, C. was appointed Minister for Foreign Affairs, a position for which he was specially qualified, and his dispatches, written at this time, are models of manliness and lucidity. In 1812 all his eloquence was enlisted in favor of Catholic emancipation. During the same year he was elected for Liverpool, for which he was again returned three successive times. In 1814 he went as ambassador to Lisbon, returned in 1816, and was made President of the Board of Control, and supported the Liverpool ministry in all their arbitrary and repressive measures until 1820, when he resigned in consequence of the action of the government against Queen Caroline. Nominated Governor-general of India in 1822, he was on the eve of departure when the suicide of the Marquis of Londonderry called him to the head of Foreign Affairs. In this capacity, C. conferred lasting benefits on his country. He infused a more liberal spirit into the cabinet, he asserted the independence of British politics against the diplomacy that would have entangled the nation with the Holy Alliance, and gave a new direction and impetus to commercial affairs by a gradual laying aside of the prohibitive system. He arranged the relations of Brazil and Portugal; drew the French cabinet into agreement with the British respecting Spanish American affairs; was the first to recognise the free states of Spanish America; promoted the treaty combining England, France, and Russia, for a settlement of the affairs of Greece, and which was signed July 6, 1827; protected Portugal from Spanish invasion; contended earnestly for Catholic emancipation; and prepared the way for a repeal of the corn-laws. In February 1827, a stroke of paralysis forced the Earl of Liverpool to resign, and Mr C. was called upon to form a new administration. His health, however, gave way under the cares of office, and he died 8th August of the same year. His remains were interred in Westminster Abbey, near those of Pitt. As a parliamentary orator, C. holds a prominent place in British annals. His acuteness of mind, power of expression, and well-pointed wit, were remarkable; but, on the whole, he was inferior to Pitt, Burke, and Fox. He lacked the imposing characteristics of the first, the overpowering enthusiasm of the second, and the winning address of the last. He was intensely British, and his foreign policy was of the character best calculated to promote British interests.

His speeches have been reprinted in 6 vols. 8vo, by Therry, and several memoirs including one by his private secretary, Mr Stapleton, have been published.

CANNING, Charles John, Viscount, second son of the above statesman, was born December, 1812. Educated at Eton and Oxford, he succeeded to the peerage as Viscount C. on his mother's death in 1837, his elder brother, who was a captain in the navy, having been drowned at Madeira in 18.8. In 1841 he became Undersecretary of State for Foreign Affairs in Sir Robert Peel's government, and afterwards Commissioner of Woods and Forests. When Lord Aberdeen came into office, he was made Postmaster-general; and in the beginning of 1856, he succeeded Lord Dalhousie as Governor-general of India. His conduct during the awful crisis of the Indian mutiny was decried at the time by many as weak and pusillanimous; but the general opinion now, when all the circumstances of the case are better known, is that he acted with singular courage, moderation, and judiciousness. He died in London, 17th June, 1862.

CANNING, Sir Stratford. See STRATFORD DE REDCLIFFE, VISCOUNT.

CA'NNON, is a general name for large pieces of ordnance or artillery, as distinguished from those pieces which can be held in the hand while being fired. No military weapon in use before the invention of gunpowder can fairly come under this designation; they were more generally of the kinds described under BALISTA. At what exact date C. were first used is not known; but C., called "crakys of war," were employed by Edward III. against the Scots in 1327, by the French at the siege of Puy Guillaume in 1338, and by Edward III. at Crecy, and at Calais in 1346. The first C. or *bombards* were clumsy, wider at the mouth than at the chamber, and made of iron bars hooped together with iron rings. The balls fired from them first made of stone, afterwards superseded by iron. In the 15th c., various kinds were known by the names of C., bombards, culverins, serpentines, &c. Bombards of

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great length and power were employed by Louis XI. during his Flemish campaign in 1477, some with stone balls, some with iron. About this time, C. began to be made by casting instead of with hooped bars; and bronze or brass as a material began to be used as well as iron. The C. of the 16th c. were generally smaller, but better finished, than those of the 15th. The largest C. made in the 17th c., so far as is known, was the Bejapoor cast-iron gun, "Malick ó Meidan," or "Lord of the Plain," made either by Aurungzebe or by the Mahrattas; it was 14 feet long, 28 inches bore, and required a ball of 1600 lbs. weight. From the time of the great European wars in that century, C. have undergone vast improvements, as well as the science and art of artillery necessary for their management. Major Straith, a leading authority on this matter, gives the following tabular view of the chief kinds of ordnance in use in the British service, prior to the introduction of rifled guns:

Kind.	Name.	Calibre. Inch.	Length. Feet.	Length. Inch.	Weight. Cwt.
Iron Shell Guns,	12 inch,	12	8	4	90
	10 "	10	9	4	84
	8 "	8	8	9	60
Long Iron Guns,	32-pounders,	6.4	9	5	56
	24 "	5.8	9	0	47
	18 "	5.3	9	0	42
	12 "	4.6	9	0	33
	9 "	4.2	8	6	28
Long BrassGuns,	12 " (medium),	4.6	6	7	18
	9 "	4.2	6	0	13
	6 " (heavy),	3.7	8	6	28
	6 " (light),	3.7	5	0	6
	3 " (colonial),	2.9	4	0	3
	1 " "	2.0	5	0	2
Iron Howitzers,	10 inch,	10.0	5	0	40
	8 "	8.0	4	0	20
Brass Howitzers,	32-pounders,	6.3	5	3	17
	24 "	5.0	4	9	12
	12 "	4.6	3	9	6
Iron Carronades,	68 "	8.0	5	2	29
	42 "	6.3	4	4	23
	32 "	6.2	4	0	17
	24 "	5.7	3	9	13
	18 "	5.2	3	3	10
	12 "	4.5	2	8	6
Iron Mortars,	13 inch,	13.0	3	1	86
	10 "	10.0	2	4	16
	8 "	8.0	1	11	8
Brass Mortars,	5½ inch,	5.5	1	3	150 lb.
	4⅝ "	4.6	1	0	104 "

It must be borne in mind, however, that many of the novelties introduced within the last few years are not here included. Nevertheless the table will be useful for occasional reference. The apparent inconsistencies in length and weight are due to the great differences in thickness of metal; and if we were to go beyond the limits of the table, we should find that, during half a century, iron 32-pounders have varied from 63 down to so low as 25 cwt., and 24-pounders from 50 to 38 cwt.; in each case the length and weight varying, while the calibre remains constant. In the above table the calibre is not always precisely the same for the same weight of ball; as instanced by the 32-pounders, which have 6·2, 6·3, and 6·4 inches calibre; this is due to the fact that some guns have more *windage*, or space round the ball, than others.

In England, during the last few years, great expense has been incurred in replacing old C. by others of larger power and calibre; while the French are gradually bringing about a limitation in the number of kinds and sizes, for the sake of simplicity.

This being merely a general or collective notice of all kinds of C. as a class, par-

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ticulars concerning each kind will be found under such headings as ARMSTRONG GUN, CARRONADE GUN, HOWITZER, LANCASTER GUN, MORTAR, SHELL GUN, &c.

CANNON, Alloys for. The material formerly used for the manufacture of ordnance was Bronze, (q. v.) consisting of about 90 parts of copper to about 10 parts of tin. In the casting of small C., such as 8-pounders, the alloy used contained 92¼ parts of copper to 7¾ parts of tin; while in the larger C. the tin was increased until the proportion reached 88 to 12. The presence of the tin increased the hardness of the alloy, but this was obtained at the expense of the tenacity. Great care must be taken to insure the purity of the copper and the tin. If lead is present, the alloy is always more or less soft, and, moreover, liable to fuse after repeated explosions; while the presence of a mere trace of sulphur, arsenic, phosphorus, &c., renders the alloy very brittle. It was customary, in the casting of C., to use up old C. or other bronze implements, so as to form a beginning of the fused metal in the furnace, and then to add little by little the extra amount of copper and tin. This mode of procedure was followed, owing to the difficulty found in getting copper and tin to amalgamate readily, so as to yield an alloy of uniform composition. This point is of great importance in the casting of ordnance, as the metals, when not properly alloyed, are liable to separate during cooling, and yield a C. of variable composition throughout. With the exception of small steel mountain guns, all British cannon are made of wrought iron.

CANNON FOUNDING. Since Sir W. Armstrong succeeded, by a process first brought under the notice of the British government in 1854, in making of malleable iron a field-gun of far greater efficiency than any previously in use, cannon founding has in most European countries gradually ceased. This manufacture, which was formerly an important one, is, however, still carried on in the United States, Sweden, and Russia, all three of which countries produce cast iron of a very superior quality.

Cannon are cast in moulds of loam or sand prepared with the help of a pattern, as described under FOUNDING. They are usually cast vertically with an extra mass of metal poured in at the top end of each mould to secure by its pressure greater solidity in the walls, as is often done in the case of a hydraulic cylinder. This superfluous portion is, of course, afterwards removed. Cannon are, or at least were, often cast solid with the same object, and afterwards bored, although it is by no means certain that such are generally sounder or of closer texture than those which are cast hollow. In either case the inner surface of the cannon is accurately finished with a boring tool to the required calibre, and the outer surface turned. Brass, or rather bronze cannon were usually cast in loam by means of a clay model on which were often stuck ornamental figures in wax, these being melted out of the mould before casting.

In the United States cast-iron guns are made by Rodman's process; that is, they are cast hollow on a core barrel which is filled with water. This is applied so as to cool the metal of the guns in layers, thus modifying the initial strain upon it, and producing the best result that can be obtained from cast iron for ordnance purposes. Within the last few years guns as large in the bore as twenty inches have been cast by this method at Pittsburg, and one of the same size has been made by it in Russia. The latter weighs 44 tons, throws a spherical ball of 9 cwt., and took 3½ months to finish. Its cost was not more than one-fourth that of a built-up gun of steel for the same weight of projectile.

Many of the earlier pieces of ordnance, it is curious to observe, were made of hooped bars, in which one can trace the germ of the process by which the Armstrong gun is made. Indeed it is doubtful if any modern plan of constructing large guns was not tried in olden times, as is seen by an examination of the different kinds of old cannon still preserved. These, however, had to be constructed without the aid of the steam-hammer and other appliances, which render such work comparatively easy nowadays, and were accordingly deficient in strength. The earlier wrought-iron cannon were eventually superseded by those made of cast iron and bronze, but not entirely for some considerable time after the latter had been in use.

The mortar, which was introduced about the commencement of the 14th c., appears to have been not only the most ancient form of cannon, but the first European fire-arm as well. From the beginning of the 15th c. cannon were cast in bronze,

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and some of great size are stated to have been used at the siege of Constantinople in 1453. Probably hand cannon of cast iron date as far back as bronze guns, and at anyrate we know that large and excellent cannon were made of cast iron in the early part of the 16th c., they having been used at Flodden, and England having even then acquired a reputation for this kind of ordnance. See FIREARMS. Cannon founding has therefore been practised for nearly 500 years, and although the art is now to all appearance doomed to decay, no one can predict, in these days of metallurgical wonders, what further change improvements in the manufacture of iron and steel may bring about as respects the making of large firearms. In order that the cast guns made on the old system may still be available for some purposes in modern warfare, Colonel Hay Campbell, some years ago, proposed a plan for lining bronze, and Sir W. Palliser another for lining cast-iron cannon with a tube of wrought iron. Some have been transformed on the Palliser system, which consists in boring a certain thickness off the old gun, and forcing a coiled wrought-iron barrel into the interior, and are said to have given very remarkable results as regards endurance.

Certain peculiarities in the manufacture of special kinds of ordnance are noticed in the articles relating to them. See WAR-SERVICES.

CANNON-BALL TREE (*Couroupita Guianensis*), a tree of the natural order *Lecythidaceæ*, a native of Guiana, of great size, the trunk being often more than two feet in diameter. It has large ovate-oblong leaves; the flowers are produced in racemes, they are white and rose colored; and the fruit is large, "about the size of a 24-pound shot," nearly round. The hard woody shell of this fruit is used for drinking-vessels.

CANNSTADT, a town of Würtemberg, beautifully situated on the Neckar, about 2 miles north-east of Stuttgart. It owes its origin to the Romans, of whose presence there are still found many traces. It has numerous mineral springs discharging 800,000 cubic feet of water in the 24 hours, which are much frequented during the season; manufactures of woollens, cottons, tobacco, &c., and a large trade by means of the Neckar. Pop. (1875) 15,065.

CANO, Alonso, an illustrious Spanish painter, the founder of the School of Granada, in which city he was born, March 1601. He received his first instructions in the principles of art from his father, Miguel Cano, who was an architect; studied sculpture under J. Montanes, and painting under Pacheco and Juan de Castillo; and attained celebrity so early, that, in 1638 or 1639, he was appointed court painter and architect to the king. C. was of a hasty temper, and was accused of having murdered his wife in a fit of violent jealousy, but the accusation appears to have been quite groundless. He was, however, subjected to the torture; but no confession having been elicited, he was acquitted and received again into the royal favor named residentiary of Granada, and spent his last years in acts of devotion and charity. He died at Granada in 1664 or 1667. In the opinion of Fuseli, he excelled all his contemporaries except Velasquez. His eminence in the three departments of the fine arts—sculpture, painting, and architecture—obtained for him the hyperbolical honor of being called the *Michael Angelo* of Spain. His pictures, marked by graceful design and pleasing coloring, are very numerous, and are preserved in Granada, Seville, Madrid, Malaga, and other Spanish cities.

CANOE* is a boat made of a hollowed trunk of a tree, or of the bark shaped and strengthened. Canoes have been made large enough to carry twenty or thirty hogsheads of sugar. Some have decks, and carry sail of rush or silk-grass; but

* The word is sometimes said to have been borrowed by the Spaniards from the native Indian name of such boats. But a similar name exists in the Aryan language: Ger. *kahn*, a boat; Old Fr. *cane*, a ship, and *canot*, a boat. The root of these words is the same as that of *cane* (Lat. *canna*), a reed or hollow stem, and signifies hollowness, capacity: Gr. *chaino*, to gape or *yawn*. From the same root come *cann*, a drinking-cup; *cannon* (Ital. *cannone*, properly a large tube, being an augmentative from *canna*, a hollow stem or tube); *canon* (Gr.), a ruler or straight rod, most readily obtained from a joint of a reed; *canal* (Lat. *canalis*, a pipe or conduit).

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they are generally open boats, rowed by paddles, and steered by an oar. They are seldom wide enough for two men to sit abreast, but vary greatly in length. Near sea-coasts, canoes are often made of light wooden-frames, covered with seal-skins, which are also drawn across as a deck, with only a hole left for one man to sit in. In the Hudson's Bay Territories, canoes are used which are light enough to be carried over the *portages*, or portions of river too shallow for navigation. Canoes hollowed out of the trunks of oaks, seem to have been in use among the early inhabitants of the British Islands. They have been dug up in considerable numbers in England, Scotland, and Ireland. They appear to have been chiefly of two sorts—one about 10 feet long, with square ends, and projecting handles; the other, about 20 feet long, sometimes sharp at both ends, sometimes round at the prow and square at the stern.

CA'NON, a word originally Greek, and signifying a measuring-rod (see CANOE—foot-note), applied in various arts and sciences to what serves for a rule or standard, but particularly employed to designate collectively those books which constitute the Holy Scripture, and are accepted by Christians as a rule of faith. See BIBLE. In ecclesiastical language, the word *canon* signifies, besides, not only a church-precept, but also the decree of a universal council, which is held valid as law. See CANON LAW. At one period the word was used to designate the prayers which the Roman Catholic priests said before, at, and after the consecration of the Host; the term is also employed to denote the catalogue or register of Catholic saints.

CANON, an ecclesiastical dignitary, so called as living under a rule, or as following the rule or canon of divine service. His office is of no great antiquity. According to Paschier, the name was not known before Charlemagne. This, however, is not precisely true, for the term C. was applied in the 4th c. to cenobites living under a common rule; but the office of C. is supposed to have been first instituted by Chrodegand, or Chrodegang, Bishop of Metz, in 763. It is at least certain that he was the author of the oldest canonical rule, which was simply an adaptation of the monastic rule (commonly but erroneously attributed to St Augustine) to the priests and "clerks" specially attached to the service of a cathedral or other church. It enjoined on the canons manual labor, the practice of silence at certain times, confession twice a year, and other duties needless to specify. The canons formed the council of the bishop and assisted him in the government of his diocese. They lived in a house called a *monastery*, slept in a common room, ate at the same table, and were originally supported out of the episcopal revenues. In 816, Louis le Débonnaire induced the Council of Aix-la-Chapelle to draw up a general rule for the whole body of canons. Canons found their way not long afterwards into England, Scotland, and Ireland. Various reforms of C. were made in the 11th and beginning of the 12th century. Gradually, however, many began to emancipate themselves from the restrictions of monastic life, and to live independent of any rule, which is not at all surprising, for the canons were wont to keep apart from the "lower clergy," as they called parish priests and others who really labored to impart religious instruction. They were often of noble families, loved titles—at Lyon, they were called *counts*—and in general were men of the world rather than true churchmen. Some of these reformed or remodelled Canons were called Black Canons, from wearing a black cossock; others, White Canons, from wearing a white habit like the *Præmonstratenses* of Picardy in France. The class of *secular* canons, whose manner of life was not conventual, and who therefore escaped destruction in England when the monasteries were abolished by Henry VIII., probably originated in a tendency to relax the severity of rule enjoined on the regulars, which indeed was hardly less stringent than in the case of ordinary monks. Secular canons still exist in the Anglican Church, and their duties—making allowance for the difference between the Roman Catholic and Protestant religions—are much the same in kind as they were before the Reformation. See CATHEDRAL.

CANON, in Music, a kind of fugue in which not merely a certain period or phrase is to be imitated or answered, but the whole of the first part with which the C. begins is imitated throughout by all the other parts. As in fugues, the melody of the part to be imitated is called the subject, and the others its reply. The C. is the

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highest degree of mechanical and musical contrivance. The ancients spent more time in the construction and resolving of mere puzzling and unentertaining canons, than in the cultivation of good harmony and melody. Good canons, however, are always interesting, and different from any other composition. For a full treatment of the method of writing a C., see Marpurg's "Abhandlung von der Fuge" (Peters, Leipzig).

CANON LAW is a collection of ecclesiastical constitutions for the government and regulation of the Roman Catholic Church, although many of its regulations have been admitted into the ecclesiastical system of the Church of England, and still influence other Protestant bodies. It was compiled from the opinions of the ancient Latin Fathers, the decrees of general councils, and the decretal epistles and bulls of the Holy See. These, from a state of disorder and confusion, were gradually reduced into method, and may be briefly described in the following chronological order: 1. "Gratian's Decree," which was a collection of ordinances in three books, commenced by Ivo, Bishop of Chartres, 1114, A. D., and subsequently corrected and arranged by Gratian, a Benedictine monk, in the year 1150, after the manner of Justinian's "Pandects of the Roman Law." This work comprises ecclesiastical legislation, as it may be called, from the time of Constantine the Great, at the beginning of the 4th, to that of Pope Alexander III., at the end of the 12th century. 2. The "Decretals." They are a collection of canonical epistles, in five books, written by popes alone, or assisted by some cardinals, to determine any controversy, and first published about the year 1230, by Raimundus Barcinus. They lay down rules respecting the lives and conversation of the clergy, matrimony and divorces, inquisition of criminal matters, purgation, penance, excommunication, and other matters deemed to be within the cognizance of the ecclesiastical courts. To these five books of Gregory, Boniface VIII. added a sixth, published 1298, A.D., called "Sextus Decretalium," or the "Sext," which is itself divided into five books, and forms a supplement to the work of Barcinus, of which it follows the arrangement. The "Sext" consists of decisions promulgated after the pontificate of Gregory IX. Then there came the "Clementines," which were constitutions of Pope Clement V., published 1308 A.D. These decretals form the principal portion of the canon law. John Andreas, a celebrated canonist in the 14th c., wrote a commentary on them, which he entitled "Novellæ," from a very beautiful daughter he had of that name, whom he bred a scholar; the father being a professor of law at Bologna, had instructed his daughter so well in it, that she assisted him in reading lectures to his scholars, and therefore to perpetuate her memory, he gave that book the title of "Novellæ." 3. The "Extravagants" of John XXII. and other later popes, by which term is meant to be denoted documents which transcend the limits of a particular collection of regulations. These books, viz., "Gratian's Decree," the "Decretals," and the "Extravagants," together form the "Corpus Juris Canonici," or great body of the "canon law," as formerly received and administered by the Church of Rome. There are, however, other publications of a later period, of more or less authority, but which do not appear to have received the formal sanction of the Holy See.

This C. L., borrowing from the Roman civil law many of its principles and rules of proceeding, has at different times undergone careful revision and the most learned and scientific treatment at the hands of its professors, and was very generally received in those Christian states which acknowledge the supremacy of the pope; and it still gives ecclesiastical law more or less to Roman Catholic Christendom, although its provisions have in many countries been considerably modified by the *concordats* (q. v.) which the popes now and then find it expedient to enter into with Roman Catholic sovereigns and governments, whose municipal system does not admit of the application of the C. L. in its integrity. Indeed, the fact of its main object being to establish the supremacy of the ecclesiastical authority over the temporal power, is sufficient to explain why, in modern times, it is found to conflict with the views of public law and government, even in the case of the most absolute and despotic governments.

This ecclesiastical system, however, never obtained a firm footing in England, and the great lawyers and statesmen have always shewn not only an unwillingness to defer to its authority, but even an aversion to its rule. There was, however, a

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kind of national C. L. in England, composed of *legative* and *provincial* constitutions, adapted to the particular necessities of the English Church. The legative constitutions were ecclesiastical laws, enacted in national synods, held under the Cardinals Otho and Othobon, legates from Pope Gregory IX. and Pope Clement IV., in the reign of King Henry III., about the years 1220 and 1268. The *provincial* constitutions are principally the decrees of provincial synods, held under divers archbishops of Canterbury, from Stephen Langton, in the reign of Henry III., to Henry Chicheley, in the reign of Henry V., and adopted also by the province of York in the reign of Henry VI. At the dawn of the Reformation, in the reign of Henry VIII., it was enacted in parliament that a review should be had of the C. L.; and till such review should be made, all canons, constitutions, ordinances, and synods's provincial being then already made, and not repugnant to the law of the land or the king's prerogative, should still be used and executed. And as no such review has yet been perfected, upon this enactment now depends the authority of the C. L. in England, the limitations of which appear, upon the whole, to be as follows: that no canon contrary to the common or statute law, or the prerogative royal, is of any validity; that, subject to this condition, the canons made anterior to the parliamentary provision above mentioned, and adopted in our system (for there are some which have had no reception among us), are binding both on clergy and laity; but that canons made since that period, and having no sanction from the parliament, are, as regards the laity at least, of no force. See CANONS OF THE CHURCH OF ENGLAND.

In Scotland, Presbyterian though the ecclesiastical system of that country be, the old Roman C. L. still prevails to a certain extent. "So deep hath this canon law been rooted," observes Lord Stair in his "Institutes of the Scotch Law," "that even where the pope's authority is rejected, yet consideration must be had to these laws, not only as those by which church benefices have been erected and ordered, but as likewise containing many equitable and profitable laws, which, because of their weighty matter, and their being once received, may more fitly be retained than rejected." In two old Scotch acts of parliament, made in 1540 and 1551, the C. L. is used in conjunction with the Roman law to denote the common law of the country, the expression used being "the common law, baith canon, civil, and statutes of the realme." See on the subject of this article generally the following authorities—Blackstone's "Commentaries," by Kerr, vol. i. pp. 65 and 66; Stephen's "Commentaries," 4th edition, vol. i. pp. 61 and 69—vol. ii. pp. 251, 256, 257, and 290—vol. iii. pp. 45, 48, and 421—and vol. iv. p. 242; Dr Irving's "Study of the Civil Law;" and Phillimore on the "Influence of the Ecclesiastical Law, &c.," 1851. See also a discriminating article on this subject in Knight's "Political Dictionary," 1845; and see Wharton's "Law Dictionary," 2d edition, 1859. It will also be found carefully treated in Dr Hook's "Church Dictionary," 7th edition, 1854. In regard to Scotland, see Stair's "Institutes of the Law of Scotland," I. 1, 13, and II. 8, 29; and Erskine's "Institutes" of the same law, I. 1, 28.

CANO'NICAL HOURS are the times fixed for divine service in the Catholic Church, but no longer strictly adhered to. These have not always been the same, and it is not known when nor by whom they were settled—some say by Popes Damasus, or Gelasius, or Gregory—but they are now fixed at seven; viz., Matins and Lauds, Prime, Tierce, Sext, Nones, Vespers, and Compline. These used to be observed as follows: Prime, Tierce, Sext, and Nones, at the first, third, sixth, and ninth hours of the day, counting from six in the morning; Vespers at the eleventh hour; Compline, or Completorium, as completing the services of the day, at midnight; and Matins shortly after midnight. These hours were by the Anglo-Saxons called Uhtsang, Primesang, Undersang, Middaysang, Noonsang, Evensang, and Nightsang. The first two and the last formed the nocturnal, the remaining four the diurnal offices. The reasons given for the dividing the day into seven parts were—that in seven days the creation was completed, that seven times a day the just man falls, there are seven graces of the Holy Spirit, seven divisions of the Lord's Prayer, seven ages of a man's life, &c. The hours had also each its mystical reference to certain sacred occurrences, such as the incidents at our Lord's birth and crucifixion. The word "hour," in C. H., is derived, as some have suggested, from *ora*, a prayer; but more probably from *hora*, an hour, and called canonical because

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according to the canon or rule of the church. The proper offices for the C. H. are to be found in the BREVIARY (q. v.).

CANONICALS, a term used to describe the proper ecclesiastical dress of the clergy. See VESTMENTS.

CANONISATION, in the Church of Rome, the act of the pope by which a deceased person is solemnly declared to be a saint. It had its origin in the practice of the early church, of inserting in the commemorative prayer of the Eucharistic Liturgy the roll of the names of those who had died as martyrs, or distinguished themselves as confessors of the faith. This record was entered in the diptychs of the church, and read in the so-called "Canon" of the liturgy. Each bishop was at first accustomed to declare deceased persons to be saints. In the West, the exercise of this power came to be reserved to the popes, and the ceremonial itself was invested with much solemnity, and regarded as of very great importance. The first papal C. was accomplished by John XV. The popes have possessed the exclusive right since 1170. The right of *Beatification* (q. v.) also belongs to them. When it is proposed to canonise a person of reputed sanctity, the pope declares his views in a consistory, and an inquiry is instituted as to the virtues and merits of the person proposed. The form of inquiry is that of a regular process at law, and an ecclesiastic is specially appointed to contend against the claims advanced, who receives the designation of *Advocatus Diaboli*; and on failure of satisfactory proof, the process is abandoned. When a favorable decision is pronounced, the ceremony of C. is performed in St Peter's Church with great pomp. The last C. was in 1862.

The Greek Church also recognises *Canonisation*. The right to perform the ceremony lies with the Patriarch of Constantinople, but it has rarely occurred. An analogy to Christian canonisation has been found in the Apotheosis (q. v.) of the ancient Romans.

CANONRY, the office and dignity of a CANON. See CATHEDRAL.

CANONS, Book of, in Scottish ecclesiastical history, a code of canons or rules for the Church of Scotland, prepared by the Scottish bishops, in obedience to the command of Charles I., revised by Laud, and confirmed by letters-patent under the great seal, 23d May 1635. It tended much to increase the dissatisfaction prevalent throughout Scotland, and which soon broke out so violently. It not only required the most strict adherence to the Liturgy, then not yet published, but enjoined many things concerning ceremonies in worship beyond what Laud had been able to introduce in the Church of England; it also took away the powers of church-courts, and decreed the penalty of excommunication against all who should deny the government of the church by bishops to be scriptural, whilst its very first canon decreed that penalty against all who should deny the king's supremacy in ecclesiatical affairs.

CANONS OF THE CHURCH OF ENGLAND, called Constitutions and Canons Ecclesiastical, agreed upon, with the king's licence, in the synod held at London in 1603—1604. They were drawn up by the Convocation, in order to give effect to the decisions of the Conference held at Hampton; and are, for the most part, a digest of old canons, with some new ones added. They are 141 in number. They are the basis of the ecclesiastical law, as far as the clergy are concerned, but they are not binding upon the laity, except in so far as they are declaratory of the ancient canon law. There had been a previous body of canons drawn up in 1571, but these had not been sanctioned by the sovereign. In 1640, the Convocation, which was then assembled with the parliament, prolonged its session beyond it, and passed a body of canons of a very arbitrary character; amongst other things, enjoining that on some Sunday in every quarter, every officiating minister should insist on the divine right of kings and their prerogatives, and enforce conformity to the rites of the Church of England. In these canons, it was directed that the communion-table should be railed in, and be placed as in cathedrals, as is now done in all churches. These canons were abrogated by an act passed in the 13th year of Charles II. An account of these canons and those now in force may be found at length in Hook's "Church Directory."—Every clergymen, when instituted to a benefice or licensed to

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a cure, promises CANONICAL OBEDIENCE to the bishop—i. e., the obedience due according to the canons of the church.

CANO'PIC Vases were vases used by the Egyptian priests to contain the viscera of embalmed bodies. They were arranged in a series of four—the first contained the stomach and larger intestines; the second, the smaller intestines; the third, the lungs and heart; and the fourth, the liver and gall-bladder; and each had on its lid the head of the particular deity who was supposed to preside over the contents.

CANO'PUS, or Cano'bus, a city of ancient Egypt, from which the Canopic mouth of the Nile derived its name, was situated on the sea-coast, 15 miles east of Alexandria. The Canopic mouth of the Nile appears to have been at an early period the only one into which foreign ships could enter. At C. the boundary-line between Asia and Africa was drawn by the ancient geographers. There was a temple of Hercules here, which was a secure sanctuary to all who fled to it; also one of Serapis, as several extant Greek inscriptions shew. The inhabitants of C., a mixed Egypto-Hellenic people, were infamous, in the Greek and Roman times, for their profligacy. The city declined after the rise of Alexandria. Traces of its ruins are visible about 8 miles from Aboukir.

CANOPUS is also the name of a very brilliant star of the southern hemisphere, in the constellation of the ship Argo, and, as Plutarch relates, received its name from Canopos, the pilot of Menelaus.

CA'NOPY (Lat. *Canopeum;* Gr. *Kōnōpeion*, from *Kōnōps*, gnat or mosquito). The derivation of this word throws a curious light on its original meaning, which probably was a mosquito-curtain. The simplest form of C., in this its primitive sense, is that mentioned by Herodotus (ii. 95), who tells us that the fishermen on the Nile were in the habit of suspending the net with which they had fished during the day on an upright pole, from which it was expanded into the form of a tent, and served to protect them from the attacks of insects during the night. As it has been proved that insects will not pass through the meshes of a net, though wide enough to admit them, it is probable that this simple contrivance may have been quite effectual for the purpose for which it was used. Horace (Epod. ix. 9), and others of the ancient writers, mention gnat-curtains (canopea). Subsequently, the same term came to be used for the projecting covering and hangings of a bed, without reference to their original use, and latterly for any projecting covering of a similar form, to whatever use it might be adapted, or of whatever materials it might be formed. C. is thus used to signify the covering which is borne over the heads of kings and other persons of distinction, and still more frequently over the Holy Sacrament and the image of Christ, in processions in Roman Catholic countries. See BALDACHIN.

In Gothic architecture, C. is the term applied to those rich coverings which are frequently met with over niches and tombs, and sometimes over doors and windows. It belongs chiefly to the decorated and perpendicular styles, though it was not unknown much earlier. The C. consists of a roof, which may be supported on pillars all round, or may have one, or if an angle *two*, sides attached to the wall, with dependent ornamental work representing drapery. The early English canopies are usually simple in form; those in French buildings of the same period being greatly more complicated and elaborate, as, for example, those in the cathedrals of Chartres and Bayeux. In the decorated style, the canopies were richly ornamented and very various in form. Some canopies are ornamented by pinnacles supporting smaller canopies, the whole terminating in a structure resembling a small turret, or crocketed spire. In the perpendicular style, though more varied in form, the canopies resemble those in the decorated. Most of the cathedrals and larger churches of England furnish examples of canopies, many of which are enumerated in Parker's "Glossary of Architecture." For the use of canopies in Italian architecture, see BALDACHIN.

CANO'SA, a town of Southern Italy, in the province of Bari, 13 miles southwest of Barletta. It is situated on the declivity of a steep hill, upon the summit of which there are the remains of an old castle. It has a cathedral; and in an adjoining court is a tomb to Bohemond, Prince of Antioch. It is chiefly remarkable, however, in connection with the discovered antiquities of ancient *Canusium* (one of the chief cities of the Apulians, the origin of which is obscured in the mists of mythology), on the site of whose citadel the modern town is said to stand. The

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antiquities consist of subterranean sepulchres, containing painted vases and funereal furniture of the most magnificent description in perfect order, painted busts, marble statues, &c. Many of the bodies found here were attired in cloth of gold, with head-dresses, gleaming with precious stones, and earrings and bracelets of rich and exquisite workmanship. The objects were transferred to the museum at Naples. The ruins of an amphitheatre, aqueduct, &c., have also been found. C. suffered by earthquake in 1851. Pop. 14,500.

CANO'SSA, a town of Northern Italy, in the province of Reggio, about 12 m. s.w. of the city of Reggio, celebrated as the place where, in 1077, the Emperor Henri IV. of Germany obtained absolution from Pope Gregory VII., after three days' humiliation. The place, formerly of some importance, is now deserted.

CANO'VA, Antonio, the founder of a new school of Italian sculpture, was born November 1, 1757, at Possagno, a village in the Venetian territory. Having displayed in boyhood great talent in modelling, the artist gained the patronage of Giovanni Falliero, a Venetian senator, by whom he was sent to work under a sculptor at Bassano. His first imaginative performance, "Eurydice," half the size of life, was executed in his 17th year. After this he went to Venice, where his study of art properly began. In 1779, Falliero sent him to Rome, with an introduction to Cav. Zuliano, the Venetian ambassador, and one of the most illustrious patrons of art at this time in Italy. In Rome, the first result of his studies appeared in the statue of "Apollo," which must be regarded as his earliest efforts in ideal sculpture; but a far greater progress toward the pure style of the antique was evident in his next work, "Theseus with the Centaur." Nevertheless, C. did not rigorously adhere to the severe simplicity of the antique, but rather took pains to mitigate it by a peculiar grace and loveliness of his own, such as characterised his group of "Cupid and Psyche," which was produced soon after he had completed the monument of Pope Clement XIV. This is apparent even in the colossal monument of Clement XII., (erected in St Peter's, 1792); though this work, on the whole, is a magnificent effort of genius, simple in style, and with nothing overwrought in the figures. Among his other works may be noticed a "Winged Cupid," "Venus and Adonis," a "Psyche holding a Butterfly;" "Penitent Magdalen," in life-size; "Hercules hurling Lichas from the rock," a colossal work, but not free from affectation; "Kreugas and Damoxenos" (two pugilists), "Palamedes," and "Perseus with the head of the Medusa," a work which, more than all previous efforts, served to raise his fame. In 1802, C. was appointed by Pope Pius VII. chief curator of all Roman works of art in the Papal States; but was soon called away to Paris, to prepare the model of a colossal statue of Bonaparte.

After the fall of the French empire, C., in 1815, was employed by the Roman government as ambassador to recover the works of art which had been taken to Paris, and paid a visit to England. On his return to Rome, he was created Marquis of Iechia, with a pension of 3000 scudi. This money he expended in the support of art and artists in Rome. C. died in Venice, 13th October 1822. A marble statue was erected to his memory in the Church de' Frati, 1827. Another monument to C. was erected in the library of the capitol, by order of Leo XII., in 1833.

It is universally allowed that to C. belongs the honor of having restored to sculpture the position which it had lost among the modern fine arts. After Michael Angelo Buonarotti and Bernini, he was the third of epoch-making Italian sculptors. His delicate execution and masterly treatment of marble are unrivalled, and even his faults—viz., his exaggerated nicety and carefulness, and his use of corrosives to produce fine finish—served to attract by the novel effects which they produced. The essential characteristic of all his works is sentiment—often verging, however, on sentimentalism—and this also, like his delicacy in details, was accordant with the taste prevalent in his time, and was the chief cause of his popularity, as of his errors. When judged by the sterner principles of antique sculpture, the works of C. are found deficient in that objective or realistic character which Thorwaldsen could express so well.

During his leisure hours, C. amused himself in painting, in which he attained such a degree of excellence in following the coloring of the Venetian masters, that his pictures have even deceived connoisseurs. In his private life, C. was a very amiable and benevolent man. Biographies of C. have been written by Missirini (4

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vols. Prato, 1824), Cicognara (Venice, 1823), Rosini (Pisa, 1825), and D'Este (Florence, 1864).

CANROBERT, Françoise Certain, de, Marshal of France, born in 1809, studied in the military school of St Cyr, and in 1828 entered the army. In 1835 he sailed for Algeria, and during the war in the province of Oran was made a captain. In the storming of Constantine, he was one of the first who entered the breach, when he received a wound in the leg. About the same time he had the decoration of the Legion of Honor conferred upon him. In 1846 he became lieutenant-colonel, and soon after colonel. In 1848 he had the command of an expedition against the tribes of the Bouaoun, whom he defeated at the Pass of Djerma, and was victorious against the Kabyles. As general of brigade, in 1850 he led an expedition through the rocky country of Narah, and destroyed the Arab stronghold there. In January 1853 he became a general of division. He had the command of the first division of the French army under Marshal St. Arnaud, sent to the Crimea in 1854; and at the battle of the Alma, was wounded in the breast and hand by the splinter of a shell. On the death of the marshal, C. took the chief command of the French army. In the war in Italy against the Austrians, in 1859, C. had the command of the third division of the French army; and at the battle of Magenta, June 4, his *corps d'armée* turned the left of the Austrians. In the great battle of Solferino, on the 24th of the same month, his division was hotly engaged, and lost 1000 men in killed and wounded. In 1860, he married Miss Macdonald, a Scotch lady. When war was declared by France against Prussia, in 1870, he was one of the generals in command at Woerth, where the French received such a defeat. C. was shut up in Metz with Bazaine, and was a prisoner in Germany from the capitulation of that fortress to the conclusion of peace.

CA'NSO (Cape), the eastern extremity of Nova Scotia, and the southern boundary of the entrance of Chebucto or Chedabucto Bay. It is in lat. 45° 17′ n., and long. 61° w.—2. (Strait), a passage of 17 miles in length and 2¼ in average breadth, connecting the inlet just mentioned with the Gulf of St Lawrence, so as to form an island of Cape Breton. Of the three channels between that inland sea and the open ocean, it is the one that is least frequently used by European vessels.

CANT, on shipboard, is a name given to such timbers, near the bow and stern, as lie obliquely to the line of keel. It is also a general term for anything sloping, inclined, or turned aside. "Canting" is to turn anything over, or out of its proper position.

CANT, Andrew, a Scottish divine of the 17th c., was first minister of Pitsligo, in the north of Scotland, and afterwards in Aberdeen. In July 1638, he was one of the commissioners sent to that city, to compel the inhabitants to subscribe the National Covenant; and in November of the same year, he was a member of the memorable General Assembly, held at Glasgow, which abolished Episcopacy in Scotland. He was with the Scots army when it obtained possession of Newcastle, August 30, 1640; and in 1641, on the second visit of Charles I. to Scotland, C. preached before his majesty at Edinburgh. In 1660, in consequence of a complaint presented to the magistrates of Aberdeen, charging him with having published a seditious book, entitled "Lex Rex," and with fulminating anathemas and imprecations against many of his congregation, C. relinquished his charge and left the town. He died about 1664.

CANTA'BILE, in Music, is found in several significations. In general, it is placed over passages of easy and flowing melody, as well in instrumental as vocal music. In songs, the melodies which lie chiefly in the middle region of the voice are marked C.: extreme tones of the voice have a peculiar *timbre* and character quite foreign to the cantabile. C. marked at the beginning of a piece means rather slow than quick. In the C. style the finest effects can be produced by the singer in swelling, sustained sound, the portamento, &c. C. is also called *cantilene*.

CANTA'BRI, a rude race of mountaineers in ancient Spain, were of Iberian origin, and lived in the district now known as Burgos, and on the coasts of the Bay of Biscay, which derived from them its name, *Oceanus Cantabricus*. The most important of their nine towns were Juliobrica (near the source of the Ebro), Vellica, and Concana. The C. are described as like the Scythians and Thracians in

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hardihood and martial character, sleeping on the bare earth, enduring extreme pain without a murmur, and, like most savages, leaving agricultural toil to their women. Their bravery was evinced in the Cantabrian war, a six years' contest with the Romans, begun under Augustus, and concluded by Agrippa, 25—19 B.C. Tiberius afterwards stationed garrisons in the towns of the conquered C.; but some portion retreated into their fastnesses among the mountains, where they preserved their independence. They are supposed to be the ancestors of the BASQUES (q. v.).

CANTA'BRIAN MOUNTAINS, the general name of the several ranges of coast and boundary mountains, extending along the north coast of Spain, from Cape Finistere, to the southern base of the West Pyrenees, and so dividing the coast districts from the interior elevated plateau of Castile. The summits of the mountains here and there reach the lower line of the snow region, with a more gentle slope on the south side, and forming plateau-districts from 1600 to 2000 feet high on the north, where the slopes are steeper and intersected by coast rivers, leave in several parts only narrow stripes of flat coast-land, and running out into the sea form several bold promontories. The whole group of mountains is named variously by the people of the various localities, and includes the Sierra de Aralar, Salvada, Anagña, Sejos, Albas, and Altuna—all more or less wild and romantic, but having those fertile and prosperous trading districts which distinguish the Basque Provinces and Asturias from the sterile central plateau of Spain.

CANTAL, a central department of France, formed out of the south portion of the old province of Auvergne. It has an area of 2090 square miles, and a population, in 1876, of 231,086. See AUVERGNE.

CA'NTALIVER, or Ca'ntiliver, a large bracket used in architecture for supporting cornices, balconies, and even stairs. Cantalivers are often highly ornamented.

CANTARINI, Simone, also known as Simone da Pesaro or il Pesarese, an Italian painter, was born at Pesaro in 1612. He studied under Guido Reni at Bologna; but his intolerable arrogance made him numerous enemies, and in consequence he left the city, and went to Rome, where he won a high reputation, and was thought by many to excel even his old master in the graceful finish of his brush. On his return to Bologna, he opened a school, but shortly after accepted an invitation from the duke of Mantua to visit that city. Here also his excessive self-esteem involved him in disagreeable relations with everybody, and at last he quarrelled with the duke himself, on which he left for Verona, where he died in 1648, under suspicion either of having poisoned himself, or of having been poisoned by a Mantuan painter whom he had injured. C. was distinguished in modelling and flesh-coloring. A "Madonna upborne by Angels," and a head of Guido when old, in the gallery at Bologna; and others elsewhere, remain as proofs of his skill. His thirty-seven etchings closely resemble the etchings of Guido Reni, and have, in several instances, been fraudulently sold with the mark of this master forged upon them.

CANTA'TA, in Music, is a name given to a vocal composition; but it is so very indefinite, that it in no way shews in what respect such composition differs from any other. In Zedler of Halle's great "Lexicon," the C. is defined as a "long vocal composition, the text of which is Italian, &c.; while in Sulzer's "Theorie der Schönen Künste," it is said to be "a short piece of vocal music of a pathetic nature," &c. The C. is always more extended and wrought out than the simple song, and consists of different movements.

CANTEE'N, is a refreshment-house in a barrack, for the use of the soldiers. The chief articles of food are supplied to the troops direct by the government; but wine, malt liquor, and small grocery-wares, the soldier is left to buy for himself; and the C. is, or is intended to be, a shop where he can make these purchases economically without the necessity of going beyond the precincts of the barrack. No soldier is obliged to buy anything at the C.; he may lay out his small sums elsewhere if he prefer. Formerly, the canteens were under civilians called C.-tenants, and spirits were sold. Between the years 1836 and 1845, it was found that, among 112 canteens in the United Kingdom, the rent and head-money paid varied from £4 per annum (one at Guernsey) to £1344 per annum (one at Woolwich); they brought in collectively to the government about £70,000 annually. Great intoxication having resulted from the sale of spirits at the canteens, the War Office prohibited such sale in 1847;

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as a consequence, the rents had to be lowered to the extent of £20,000 in the following year, the canteeners finding their profits much reduced. The rent paid was found to be injurious to the soldiers, who were charged higher prices within the barrack than without, and who were thence driven to places where dangerous temptations are at hand. The results of this system being undeniably bad and demoralising, the War Office now makes the canteen a regimental establishment, controlled by a committee of officers and with a C.-sergeant as salesman. Pensioned non-commissioned officers may be appointed C.-sergeants. The profits are applied for the benefit of the men of the corps.

In French barracks, the C. is a sort of club-room for the whole regiment. The cantineer is a non-commissioned officer, who acts merely as an agent for all, selling the liquors and commodities at prime cost.

CANTEEN, besides its application to a room or building, is a name also given to a vessel used by soldiers to contain whatever beverage may be obtainable on the march or in the field. It is sometimes of tin, sometimes of wood. In the British army, the C. is a wooden vessel, holding about three pints, painted blue, and inscribed with the number or designation of the regiment, battalion, and company to which the soldier belongs.

There is still another use of the word C., as a name for a leathern or wooden chest, divided into compartments, and containing the plate and table-equipage for a military officer when on active service.

CA'NTERBUBY, a municipal and parliamentary borough, a county by itself, a cathedral city, and seat of the metropolitan see of all England, in East Kent, on the Stour, 56 miles east-south-east of London, on the high road from London to Dover. The distance from London by the South-Eastern Railway is 81 miles; by the London, Chatham, and Dover line, about 60. It stands on a flat between hills of moderate height. It has the aspect of an old town, many of the houses along the high street having gabled ends and projecting fronts. It has little manufacture or traffic. The chief trade is in corn, wool, and hops. Pop. (1871) 20,962. Many are engaged in the hop-grounds. C. returns two members to parliament. It is noted for its brawn. Some remains of the walls (1¾ mile in circuit and 20 feet high) which formerly surrounded C., and one of the gates still exist. Near the city wall is a large artificial mound, known as the Dane John (probably *Donjon*), and connected with this mound is a public garden, laid out in the end of the 18th c., from the top of which is a fine view of the country around. But the great glory of C. is its magnificent

Cathedral. When St Augustine became Archbishop of Canterbury, 597 A. D., he consecrated under the name of Christ's Church, a church said to have been formerly used by Roman Christians. Cuthbert, the 11th archbishop, 740 A. D., added a church to the east of this. In the course of ages, it received numerous additions, until it assumed its present magnificent form. Among those who helped to repair, enlarge, and rebuild it, were Archbishops Odo (940 A. D.), Lanfranc (1070), and Anselm (1093). In 1174 the choir was destroyed by fire, and in order to the rebuilding of it, a number of French and English artificers were summoned. Among the former was a certain William of Sens, and to him, a man of real genius, the work was intrusted. The church was rich in relics: Plegemund had brought hither the body of the martyr Blasius from Rome; there were the relics of St Wilfred, St Dunstan, and St Elfege; the murder of Thomas Becket (q. v.) had recently added a still more popular name to the list of martyrs. The offerings at these shrines, especially the last, contributed greatly to defray the expenses of the magnificent work. William of Sens did not, however, live to see its completion. He was succeeded by another William, an Englishman, and to him we owe the completion of the existing unique and beautiful choir, terminated by the corona or circular chapel called Becket's Crown. Gervasius, a monk, who witnessed the fire of 1174, and has left an account of it, tells us that the parts of Lanfranc's church which remained in his time were the nave, the central and western towers, the western transepts, and their eastern chapels. In the 14th c., the nave and transepts were transformed into the Perpendicular Style of that period. The central tower, called the Angel Steeple, was carried up (1486—1504) to about double its original height, also in the Perpendicular Style; it is 234 feet high, and 35 feet in diameter. The

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north-west tower was taken down in 1834; it was 113 feet high, and divided into five stories. The Norman plinth still remains on each side of the nave in the side aisles, and portions of Norman ashlaring may still be seen about the transepts outside the west wall, and on the east piers of the great tower. The indiscriminate use of the "Round" or "Norman," and the "Pointed" or "Early English" arch, is also a very striking feature in the eastern part of the building. The Lady Chapel, now called the Dean's Chapel, stands on the north side of the church, and was built in 1468; the roof is a fan-vault. The north transept is called the Martyrdom, for here took place the murder of Becket, on Tuesday, December 29, 1170. Fifty years later, his remains were translated from the crypt to a shrine in the newly erected Trinity Chapel, eastward of the choir. About the year 1500, the yearly offerings at this shrine amounted to £4000; but they had then declined much in value. A curious mosaic pavement still remains in front of the place where the shrine stood, and the stone steps which lead up to it are worn by the knees of countless pilgrims; but the shrine itself was demolished in 1538, and the bones of the saint burned by order of Henry VIII. In 1643, the building was further "purified," as it was called, by order of parliament. Still very many most interesting monuments remain—such as the tombs of Stephen Langton; that which is commonly, but wrongly, supposed to be the tomb of Archbishop Theobald; with those of the Black Prince, of Henry IV., of Archbishops Maphan, Peckham, Chicheley, Courtenay, Sudbury, Stratford, Kemp, Bourchier, Warham, and of Cardinal Pole. The total exterior length of the cathedral is 545 feet, by 156 in breadth at the eastern transept. The crypt is of greater extent and loftier—owing to the choir being raised by numerous steps at the east end—than any other in England.

The Archbishop of C. is primate of all England, metropolitan, and first peer of the realm. He ranks next to royalty, and crowns the sovereign. His ecclesiastical province includes all England, except the six northern counties. Among his privileges, he can confer degrees in divinity, law, medicine, and music. His seats are at Lambeth and Addington Park. He is patron of 149 livings, and has an income of £15,000 a year. There are fourteen old churches in C., mostly of rough flint, and containing fragments of still older structures. St Martin's Church stands on the site of one of the 7th c., and is partly built of ancient Roman brick and tile. Attached to the cathedral is a grammar school, remodelled by Henry VIII. Part of St Augustine's Benedictine Abbey still remains, with its fine gateway, near the cathedral. It occupied, with its precincts, sixteen acres. The old buildings have lately received large modern additions, in order to fit them for the purposes of a missionary college in connection with the Church of England. Another recent institution for education is the Clergy Orphan School, which occupies a conspicuous position on St Thomas's Hill, about a mile out of the city. The ruins of a Norman castle, 88 by 80 feet, the third in size in England, stands near the city wall. C. stood, in Roman times, at the union of two Roman roads from Dover and Lympne, the chief seaports of the Romans. C. was the capital of Kent, and the centre from which England was Christianised. St Augustine, the apostle of England, sent by Gregory I., was the first archbishop, and baptised King Ethelbert of Kent. C. was the Saxon *Caer Cant*, City of Kent, and capital of the kingdom of Kent. The Danes in the 9th, 10th, and 11th centuries often ravaged and burned the city. Henry VIII. confiscated the treasures of the cathedral, and Edward VI. levied fresh exactions from it. The cathedral suffered much in the parliamentary struggles, but it has since been repaired.

CANTERBURY, a settlement of about 13,000 square miles, on the east coast of South Island, New Zealand, with Christchurch as its capital, and Lyttleton as its port. The district was settled in 1850 by the Canterbury Association, a society of peers, bishops, and commoners interested in the colonisation of New Zealand. It has a coast-line of about 200 miles, and is well watered by numerous rivers. Coal (in abundance), iron-ore, fire-clays, and quartz have been discovered in the province, and several coal-mines are in operation. On the eastern side of the great range of hills are the far-famed Canterbury Plains, the great sheep district of the colony—"three millions of acres rolling back in gentle rise forty miles, to the foot of the central highlands, watered by twenty rivers, and spreading north and south further than the eye can reach." The natural pastures of C. are very fine; and to this circumstance is mainly due the rapid advance in prosperity of the country. Pop. (1875)

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78,715. In 1876, wheat occupied 57,500 acres, estimated to yield 1,770,363 bushels; oats, 72,522 acres, estimated to yield 2,788,688 bushels; barley, 16,820 acres, estimated to yield 620,699 bushels; and the estimated yield of potatoes was 17,895 tons. The total value of exports in 1875 was £42,750; of imports, £1,302,440. Very excellent timber grows in the province.

CANTERBUBY BELLS. See CAMPANULA.

CANTHARE'LLUS. See FUNGI, EDIBLE.

CANTHA'RIDINE. See CANTHARIS.

CAN'THARIS (Gr. a small beetle, plural *Cantha'rides*), a genus of insects of the order *Coleoptera*, section *Heteromera*. See COLEOPTERA. It belongs to a family called *Trachelides*, or necked beetles, the head being separated from the thorax by a distinct neck or pedicle, and forms the type of a sub-division of that family called *Cantharidiæ*; many of the species of which possess blistering properties analogous to those of the common BLISTERING FLY, SPANISH FLY, or BLISTER BEETLE (*C. vesicatoria*). This insect, the best known and most important of the genus, is about an inch long; has a large heart-shaped head, rather broader than the thorax; thread-like antennæ three times longer than the head; a nearly quadrangular thorax; and soft elytra (wing-covers) concealing the abdomen, and of equal breadth throughout. It is of a bright glossy green color. The common Blistering Fly is found in the south of Europe, and in the south of Siberia. It is abundant in Italy, Sicily, and Spain, in the south of France, and in some parts of Germany and Russia. It is rare in England. The larva is not well known. The perfect insect feeds on the leaves of the ash, privet, lilac, elder, and honeysuckle; and rests on them during the night, the day being its time of activity. It is therefore taken by beating the branches of the trees in the morning or evening, when it is comparatively lethargic, a cloth being spread below to receive the insects as they fall. The gathering of *Cantharides* takes place, in the south of France, in the month of May. It requires great caution to prevent injury to those who engage in it, the insects emitting a volatile substance with a strong smell, which causes inflammation of the eyes and eyelids, convulsive sneezing, and irritation of the throat and bronchial-tubes, nor can they be handled without danger of blistering. Those who collect them, therefore, generally wear gloves and veils. Unpleasant effects have been experienced from even sitting under trees on the leaves of which cantharides were numerous. Various methods are employed for killing cantharides when they have been taken; the cloths containing them are very generally immersed in hot vinegar and water, and they are afterwards carefully dried; sometimes they are killed by the vapor of vinegar, and sometimes by oil of turpentine. Unless kept with great care, they soon begin to lose their active properties, although in stoppered bottles they remain fit for use for years. They are very liable to be injured by mites, and afford a favorite food also to a kind of moth and to some other insects. They are imported into Britain from the south of Europe, and also from St Petersburg.

The active principle of the blistering flies is *cantharidine*, which possesses such powerful blistering properties that $\frac{1}{100}$th of a grain placed on the lip rapidly causes the rise of small blisters. Administered internally, blistering flies cause heat in the throat, stomach, intestines, respiratory organs, &c.; and if in large doses, they give rise to inflammation of a serious nature, and sufficient to cause death. Externally they are employed as a *blistering agent*. There are various medicinal preparations of blistering flies, such as *Vinegar of Cantharides*, obtained by macerating blistering flies in ascetic acid; *Tincture of Cantharides*, procured by digesting blistering flies in proof-spirit, &c.; but that most commonly employed is *Plaster of Cantharides* or *Blistering Plaster*, obtained by mixing equal parts of blistering flies, yellow wax, resin, and lard. See BLISTER.

CA'NTICLES, a word which literally signifies songs, but which is specially applied to a canonical book of the Old Testament, called in Hebrew "The Song of Songs"—i. e., the most beautiful song. The author is commonly supposed to be Solomon, and in the rich luxurious splendor of its coloring, it admirably harmonises with the "golden time" of that magnificent monarch. The theme which it celebrates is love; but what kind of love, whether earthly or spiritual, is a question that

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has perplexed biblical critics. The oldest interpretations are allegorical, and are either political or religious. The former of these, considered C. as the symbolical expression of a deep longing for the reunion of the kingdoms of Judah and Israel; the latter, of the love of God for his chosen people, the Jews. The religious interpretation passed over from Judaism to Christianity, and assumed a new aspect in consequence. Origen found the Beloved Bridegroom in Christ, and the Bride in the Church or the believing soul. Only among the theologians of the Syrian school do we find an effort made to adhere to more intelligible principles of interpretation, but the "mystical view" obtained the upper hand, and has continued to be the predominant view of the poem amongst orthodox theologians. For a while an attempt was made to distinguish between a primary and a secondary sense, both more or less directly present to the mind of the author: but modern scholarship in the main contents itself with endeavoring to fix the primary or literal meaning. Nor is this an easy task. Some commentators hold, for example, that C. is an anthology of detached idyls; others argue that it is a dramatic unity composed of connected parts. Ewald has done much to establish the latter view. Ewald's followers hold that the poem was written about the middle of the 10th century B.C., in the northern kingdom of Israel, and conceived in a spirit of hostility against the luxurious court of Zion. Solomon, the type of a sensual monarch, has carried off to his harem a northern shepherd maiden, who in the poem appears surrounded by the ladies of his court. The king fails even by the proffer of honorable espousals to overcome the maiden's fervent attachment to her shepherd lover in the north country, and wholly abashed, ceases to press his suit. Finally, true and chaste love triumphs in the union of the peasant lovers.

CANTI'RE, or Kinty're (Gaelic, headland), a long narrow peninsula of Argyleshire, running north and south between Arran Isle and the Atlantic, and united at the north end with the mainland of Scotland by the isthmus of Tarbet, a mile broad between East Loch Tarbet, a small loch or bay of Loch Fyne, and West Loch Tarbet. It is 40 miles long, and, on an average, 6¼ broad. The surface is much diversified by low, undulating, moorish hills, with many lochs. The highest point is Bennear, 1515 feet. It contains much cultivated land. The north four-fifths of C., and the south-west corner round the Mull, or promontory, of Kintyre, consists chiefly of mica slate. Old red sandstone occurs on the south-east shore. Coal is found between Campbelton and the west coast. A light-house, 297 feet above the sea, stands on the Mull of Kintyre. C. includes 10 parishes. Pop. about 18,000. Campbelton (q. v.) is the chief seat of population. C. was in ancient times peopled by Picts and Celts more densely than the rest of Scotland. The Scots from Ireland subdued it in 210 A.D., were expelled from it in 446, but returned in 503 under Fergus, the first Scottish king, who fixed his seat at Campbelton. Kenneth II. (MacAlpine), on defeating the Picts in 843, removed to Forteviot. From the 8th to the 12th c., C. was occupied by Northmen from Scandinavia, and afterwards by the Macdonalds of the Isles, and more lately by the Campbells. Many burying-grounds and small ruined chapels or monasteries in C., shew its former populousness. Near these chapels, and in the villages, are many high, upright slate crosses, with rude figures and inscriptions on them. C. contains many ancient watch or word forts often vitrified.

CANTO FERMO, in Church Music, means plain song, or choral song in unison, and in notes all of equal length. Its introduction into the Christian church is attributed to Pope Gregory the Great, before the invention of the modern notation. See also GREGORIAN TONES.

CA'NTON. In Heraldry, the C. occupies a corner of the shield, either dexter or sinister, and in size is the third of the chief. It is one of the nine honorable ordinaries, "and of great esteem."

CANTON (from the Fr. *canton*, a corner, a district; Ger. *kante*, a point, corner, border; allied to Eng. *cantle*) signifies in geography a division of territory, constituting a separate government or state, as in Switzerland. In France, C. is a subdivision of an arrondissement.

CA'NTON, a large commercial city and port in the south of China, and capital of the province of Kwang-tung (of which the name C. is merely a corruption). It is

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situated in lat. 23° 7′ 10″ n., and long. 113° 14′ 30″ e., on the north side of the Chookeang, or Pearl River, in a rich alluvial plain, 82 miles from the sea. The river (the entrance to which is known by the name of the Boca Tigris, a Portuguese translation of the Chinese *Hu-mun*, "Tiger's Mouth") is very picturesque. The city is surrounded by a brick rampart six miles in circumference, and entered by 12 gates, to each of which a guard-house is attached. It forms an irregular square, and is divided by a wall into the North and South, or Old and New City. The former is inhabited by the Tartar population, the latter by Chinese: and between the two, communication is maintained by four gates in the separating wall. The suburbs are very extensive, and in one of these, facing the river, stood the European factories or *hongs*. Most of the streets of C. are crooked and labyrinthine beyond description, but there are a small number of straight thoroughfares which make it easy enough for a stranger to find his way. As a rule, a tolerably straight street leads from the waterside to each gate of the city on the southern front, and is more or less prolonged through the interior. Many of the streets are devoted to distinct trades; thus, there is "Carpenter" Street, "Apothecary" Street, &c. The Joss-houses, chiefly Buddhist temples, are said to be 124 in number. The largest of these, on Honam Island, covers seven acres, and has 175 priests attached. It is called *Hae Chwang Sze*, or "The Temple of the Ocean Banner." Another famous structure is "The Temple of the Five Hundred Gods," situated in the western suburbs. There are also several many-storied towers or pagodas, a Mohammedan mosque, founded about A.D. 850 by the Arabian voyagers, who then were accustomed to visit C., a foundling-hospital, an English and an American missionary hospital. Streets of wooden houses were formerly to be seen on the river-side, but these were swept away during the late quarrel with Yeh; and one large site that they occupied was walled in for the purpose of erecting new foreign factories, the old ones having been totally destroyed by fire. A very remarkable example of life upon the water is the boat-town of Canton. The total population of the city has been vaguely estimated at 1,000,000. The *climate* of C. may be pronounced healthy; though the heat from June to September is oppressive, and the thermometer sometimes, though rarely, stands at 100° in the shade. In ordinary years, the winter minimum is 42°, and the summer maximum 96°. The north-east monsoon commences in October, and is the prevailing wind till March, when the south-west monsoon sets in. Its average temperature is 70¾° F., and the annual fall of rain 70·625 inches. The Cantonese are notorious for their turbulence and hatred of foreigners, and the European factories have more than once been attacked by infuriated mobs, who were only kept at bay by force of arms. This hostility may, however, be greatly due to the baneful influence of those in power; for here the government of the mandarins of the present Manchu Tartar dynasty appears to have reached its maximum of corruption and barbarity, and was fitly represented by the notorious Yeh, late governor-general of Kwang-tung and Kwang-se. The author of "Twelve Years in China" gives us some startling facts illustrative of mandarinic rule in this part of China. After the defeat of the Triad rebels, who besieged C. in 1844—1845, it is estimated that 1,000,000 of people perished in the province.

The admirable situation of C. for conducting traffic explains how, from an early period, it was a favorite port with foreign merchants. The Arabs, as has been said, made regular voyages hither as early as the 9th century. The Portuguese found their way to it in the 16th century, and were followed by the Dutch a hundred years later. These in turn were overtaken and supplanted by the English before the close of the 17th century, and an immense trade was carried on by the agents of the East India Company. Their monopoly ceased on the 22d April 1834. Since that date the proceedings of the C. government officers have originated two wars with the British. The city was captured by the allied French and English forces December 1857, and continued to be garrisoned by them till October 1861. See CHINA. After the treaty of Nankin (signed Aug. 29, 1842), C. was known as one of the five ports; Amoy, Foochow, Ningpo, and Shanghai having also been thrown open to foreign commerce.

The chief exports from C. are tea, silk, sugar; the chief imports, raw cotton, piece-goods, opium, metallic wares, &c. "War and rebellion" (say the authors of the "Treaty Ports of China and Japan," Loud and Hong-kong, 1867), "The opening of Hankow as a shipping port for tea and, above all, the proximity of Hong-kong

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and Macao to the delta of the Canton River, with its unrivalled facilities for smuggling, have robbed C. of the pre-eminence it so long enjoyed in commercial prosperity." Yet the following statistics shew that the city is recovering ground:

	Total Value of Imports in Mexican Dollars.	Total Value of Exports in Mexican Dollars.
1860	18,415,727	16,257,623
1861	12,977,353	15,811,512
1862	10,580,928	17,742,590
1863	9,505,285	16,083,062
1864	8,192,795	13,659,177
1865	10,756,602	18,054,577
1866	14,171,101	18,832,623
1867	14,090,581	18,403,154
1868	12,991,266	18,491,156
1869	11,487,679	20,010,626
1870	12,053,894	19,857,543
1871	15,661,889	23,612,439

In 1874, the total value of exports was £4,610,470; of imports, £1,985,701, exclusive of treasure.

"The Middle Kingdom," by Dr S. W. Williams; "The Chinese," by Sir John Davis; Meadow's "Chinese;" "Twelve Years in China" (Edin. 1860); "Report of the Missionary Hospital in the Western Suburbs of Canton;" "Treaty Ports of China and Japan" (Lond. and Hong-kong, 186.).

CA'NTONMENTS, in the general operations of European armies, are temporary resting-places. Many circumstances, especially the state of the weather and the supply of food, influence a general in determining whether to go into C. or to encamp. In the intervals between active operations; or he may take the former course during an armistice. The quartermaster-general previously examines the district, and determines how many men and horses to place in each village; arrangements are also made for a main-guard, cavalry pickets, alarm-posts, road-barricades, lines of sentries, mounted orderlies, &c., to guard against a sudden surprise from the enemy. In C. the men are not generally under canvas, as described in CAMP.

In India, C. are *permanent* places, regular military towns, distinct and at some little distances from the principal cities. If on a large scale, such a cantonment contains barracks for European cavalry, infantry, and artillery; rows of bungalows or houses, each enclosed in a garden, for the officers; rows of huts for the native soldiery; magazines and parade-grounds; public offices and buildings of various kinds; and a bazaar for the accommodation of the native troops. During the revolt in 1857—1858, most of the outbreaks began in the cantonments. It was in the cantonment outside Cawnpore that Nana Sahib commenced his treachery.

CANTONNÉE, in Heraldry. When a cross is placed between four other objects, e.g., scallop shells, it is said to be cantonnée.

CA'NTON'S PHO'SPHORUS, or Pyro'phorus, is obtained by heating in a close vessel 3 parts oyster-shells and 1 part sublimed sulphur, when the sulphuret of calcium (CaS) is formed, which takes fire when exposed to or thrown into the air.

CA'NTOR. See PRECENTOR.

CANTU, Cesare, one of the best of modern Italian authors, was born September 5, 1805, at Brescia, in Northern Italy, and was educated at Sondrio, where he was appointed professor of *belles-lettres*. Having been imprisoned for the offence of expressing liberal tendencies in a historical work on Lombardy, C. spent his leisure hours in describing the sorrows of a prisoner in the form of a historical romance, "Margherita Pusterla" (Florence, 1845). C. has also written several religious hymns and songs, which have become popular; but his great work is the "Storia Universale" (35 vols., Turin, 1837—1842). His "History of Italian Literature" appeared in 1851; "History of the Last Hundred Years," 1852; "History of the Italians," 1859; and "Milano, Storia del Popolo e pel Popolo," 1871.

CANTU'RIO, or Cantu', a town of Northern Italy, 5 miles south-east of Como.

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It is situated in the midst of a rich district, has a church with an elegant tower, which served as a beacon during the middle ages, and manufactures of Iron-wares. Pop. 5500.

CANUN, a Turkish musical instruments, strung with gut-strings; is played on by the fingers, on which are thimbles of tortoise-shell, pointed with pieces of cocoa-nut, forming plectra for striking the strings with. The C. is a favorite instrument with the ladies in seraglios, many of whom produce very pleasant music and harmony on it.

CANUTE, or Cnut, succeeded to the ruler-ship of the Danes in England on the death of his father, Swein or Sweyn, and was by them proclaimed king of England. On the death of Ethelred, he shared the sovereignty with Edmund Ironside, who ruled over the south, while C. was monarch over the north of England. The sudden decease or assassination of Edmund made C. sole ruler in 1017, and he continued to reign until his death, in 1035 or 1036. His rule was marked at first by cruelty, but when all who were likely to interfere with his power had been disposed of, he exhibited great mildness and justice, combined with talent and judgment. The Anglo-Saxons, whose complete subjugation he had effected, did not feel their chains; they had experienced no such good government since the time of Alfred and Athelstane. He was easily accessible to all his subjects; and won the hearts of the people by his love for song and ballad, and his liberal patronage of gleemen. One verse of an English song written by C. is still extant. As soon as English affairs were settled, C. superseded his brother Harold as king of Denmark; and in 1028 he extended his dominion over Norway—becoming thus one of the most powerful princes of Europe. In his latter years he was devout.

CANVAS, regarded from an artist's point of view, is the principal material upon which oil-paintings are made. Two kinds are prepared for this purpose, of which the best is called *ticking*. Before it is put into the artist's hands, it is usually *primed*, or grounded (see GROUND) of a neutral gray, or other tint, as he may direct. Certain sizes of C. being in greater request than others, are kept ready stretched on frames. Those used for portraits are known by the names of *kit-cat*, which measures 28 or 29 inches by 36; *three-quarters*, 25 by 30 inches; *half-length*, 49 by 50; *Bishop's half-length*, 44 or 45 by 56; *Bishop's whole length*, 58 by 94.

CANVAS, Shi's. See SAIL, SAILCLOTH.

CANZO'NÉ is the name of one of the oldest and most prized forms of the Italian lyric. The word is borrowed from the Provençals, whose *cansòs* or *chansòs*, however, were not restricted to any precise form, but were simply verses intended to be sung. The Italian writers first attempted to regulate the wayward and arbitrary character of the Provençal *cansòs;* Dante, and subsequently Petrarch, being especially successful. The *Canzone Petrarchesca* or *Toscana* was any considerable lyrical poem, composed of stanzas exactly corresponding to one another in number of lines, measure, and position of rhymes, and which customarily closed with a short stanza. About the end of the 16th c., the Italian writers began to deviate from the strict form of the Petrarchian canzone. Torquato Tasso and Chiabrera are the most notable names in the new movement. The most of the canzones of the latter—called by their author *canzonette*—are written in short lines and stanzas, the position of the rhymes being also completely arbitrary.

CAOU'TCHOUC, Gum Elastic, or India Rubber, a substance which, on account of its peculiar properties, is extensively used in the arts, and of which the use is continually and rapidly increasing. It is one of the products of the wonderful chemistry of nature, being found in the milky juices of plants, and most abundantly in the natural orders *Moraceæ*, *Artocarpaceæ*, *Euphorbiaceæ*, *Apocynaceæ*, *Asclepiadaceæ*, and *Papayaceæ*. It exists in the milky juice of plants growing in temperate climates; but it is only in tropical and subtropical countries that it occurs so abundantly as to be of economical importance. Its uses to the plants in which it is elaborated have not been ascertained; and the conjectures of theorists on this subject are not supported by arguments sufficient to give them much probability. In the milky juice, the C. is diffused in the form of minute globules, and not, strictly speaking, in solution; and when the juice is extracted from the plant, and allowed to stand for a short time, these globules separate from the watery part of it, and

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form a sort of cream on the top, or, in close vessels, appear throughout it as a flaky coagulum. Caoutchouc, as well as some of its useful and curious properties, must have been known in America at a very early period, because balls made of the *gum of a tree*, lighter and bouncing better than the wind-balls of Castile, are mentioned by Herrera when speaking of the amusements of the natives of Hayti, in his account of Columbus's second voyage. In a book published in Madrid in 1615, Juan de Torquemada mentions the tree which yields it in Mexico, describes the mode of collecting the gum, and states that it is made into shoes; also that the Spaniards use it for waxing their canvas cloaks to make them resist water. More exact information regarding caoutchouc was afterwards furnished by M de la Condamine, who visited South America in 1735, but it is curious to note that some of the purposes for which India-rubber is most extensively used at the present time are the same as those for which it was employed in South America nearly three centuries ago. It was first known by the name of *Elastic Gum*, and received that of India-rubber from the discovery of its use for rubbing out black-lead pencil marks, for which purpose it began to be imported into Britain in small quantities about the end of last century, being much valued by artists, and sold at a high price. Even before this time its employment for the manufacture of flexible tubes for the use of surgeons and chemists had been successfully attempted; but the expensive character of the solvents then known for it, prevented its general application to any purpose in the arts. It was not till 1820 that its employment began to extend beyond the rubbing out of pencil marks, although in the meantime the quantity imported had considerably increased. Its application to the manufacture of water-proof cloth first gave it commercial importance. About the same time a method was discovered of fabricating articles of various kinds by casting caoutchouc in molds. Its elasticity and flexibility, its insolubility in water, and its great impenetrability to gases and fluids in general, have now been found to adapt it to a great variety of uses; but for by far the greater number of its applications it is now employed in the vulcanised state.

The caoutchouc of commerce is obtained most largely from South America, but considerable quantities are also procurred from British India, the Indian Archipelago, the West Coast of Africa, and the Mauritius. During the year 1872, the actual imports of this material into Great Britain were:

	Cwts.
From Brazil	68,143
" New Granada, Ecuador, and Central America	16,390
" British India	13,855
" Strait Settlements	15,296
" West Coast of Africa	14,185
" Mauritius	10,433
" Other Countries	18,862
Total	157,114

In 1852 the total imports were only 15,269 cwts.; in 1862, 59,703 cwts.; and in 1872, 157,509 cwts. The average annual yield of Brazil for the five years preceding 1871, according to a table sent from that country to the Vienna Exhibition of 1873, was about 5,000,000 kilogrammes, or nearly 100,000 cwts., but not more than one-half of this came to Great Britain.

Brazilian caoutchouc is the product of several species of *Siphonia* (natural order *Euphorbiaceæ*), but chiefly *Siphonia elastica*. Bates says that "this tree is not remarkable in appearance; in bark and foliage it is not unlike the European ash, but the trunk, like that of all forest trees, shoots up to an immense height before throwing off branches." The caoutchouc of New Granada, Ecuador, and Central America is obtained from *Castilloa elastica* (nat. ord. *Artocarpaceæ*), that of East India from the beautiful glossy-leaved *Ficus elastica* (nat. ord. *Moraceæ*), now so common as an ornamental plant in our conservatories, that of Borneo from *Urceola elastica*, and that of Western Africa from several species of *Landolphia*, and also *Ficus*. Species of *Valsea*, *Willughbeia*, *Euphorbia*, and other genera likewise yield useful varieties of caoutchouc, and the sources of some kinds are unknown.

Caoutchouc is sometimes collected by cutting the trees down, but much more usually by making simple incisions in the trunks. The method of collecting and

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preparing the liquid caoutchouc is thus described in a work recently published at Rio Janeiro. In a few hours, the juice which flows out fills the basins, made of large leaves and plastic clay, which are adapted to the lower part of the tree. It is then poured into other vessels of various shapes; in a short time it becomes thickened, and solidifies in consequence of the evaporation of the liquid part. In order to dry it completely, the practice is to expose it to a gentle heat; for this purpose it is suspended over a brasier lighted with wood, and the flame maintained with the fruits of auricuri, in such a manner that it may receive the smoke, hence the blackish color which the caoutchouc of commerce generally presents. Whilst it is liquid, it is fashioned by means of moulds, according to the purposes to which it is destined. An attempt has recently been made to import the juice of the tree, and subject it to the drying process in this country, but little has as yet been imported into Britain. The characters of the juice are, that it possesses the consistence of cream, has a yellow color, is miscible with water, but not with naphtha or other of the solvents of ordinary caoutchouc, and its specific gravity varies from 1·02 to 1·41—ordinary caoutchouc being 930. The juice contains about 30 per cent of caoutchouc. When heated, it coagulates (as the glaire of egg does), owing to the presence of albumen; and exposed to the air, it dries up, and leaves a film of caoutchouc. In the preparation of pure caoutchouc, the natural juice is mixed with five or six times its bulk of water, and then either heated or mixed with common salt or hydrochloric acid, when the pure caoutchouc separates as a white opaque substance, which becomes transparent when dry. Pure caoutchouc is a carbo-hydrogen, its composition being carbon 87·5 and hydrogen 12·5.

Para caoutchouc is the best, and commands the highest price in the market. The other South American kinds are of medium quality. East Indian rubber—naturally a fine quality—is too often injured by adulteration and careless collecting. The poorest kind is the West African, being clammy, offensive in its odor, and only slightly elastic.

Commercial C. is a tough fibrous substance, possessing elastic properties in the highest degree. Reduced to the temperature of freezing water (32° F.), it hardens, and in greater part, if not entirely, loses its elasticity, but does not become brittle. When heated, as by placing in boiling water, it softens, and becomes very much more elastic than at ordinary temperatures, though it does not in any degree dissolve in the water. If suddenly stretched to seven or eight times its original length, it becomes warm; and if kept in this outstretched form for several weeks, it appears to lose, in great part, its elastic properties, and in this condition is readily cut into those thin threads which are used in the *elastic* put in gloves, bonnets, &c., and the elasticity of which is readily renewed by the application of gentle heat. Of late years, however, elastic thread is usually prepared with vulcanised rubber. Commercial caoutchouc is insoluble in water and alcohol, is not acted upon by alkalies or acids, except when the latter are concentrated, and heat is applied; but is soluble in ether, chloroform, bisulphide of carbon, naphtha, petroleum, benzol, and the essential oils of turpentine, lavender, and sassafras. Many other essential and fixed oils, when heated with C., cause it to soften, and produce thick glutinous compounds, especially linseed oil, which, in the proportion of 1¼ lb. of the oil to 4 oz. C. in thin strips or films, yields a solution which, when strained, is of great use in rendering shoes, cloth, &c., water-proof. When heated to 248° F., C. fuses; and at 600° it is volatilised, at the same time undergoing decomposition, and yields a liquid called *Caoutchoucine* or *Caoutchisine*, with the specific gravity of 680, and possessing great solvent powers over C. and other substances. Caoutchoucine is necessarily very expensive, and hence its use is limited; but cordage steeped in it and dried acquires great supple and tenacious properties, and cloth saturated with it, and dried by exposure to the air, becomes water-tight.

In the employment of C. as a branch of manufacture, the first operation is the purification of the crude material as it comes from abroad. The crude material is cut into minute shreds, and washed by powerful machinery, immersed in water, which releases the solid impurities, and the pure C. being removed, is placed on iron trays, and dried in a room heated by steam. The material then undergoes a process of kneading under very heavy rollers, which causes the adhesion of the various pieces of C. to each other, and ultimately yields a mass or block of C. in which the condensation is so perfect that all air-holes, and other cells and interstices disappear.

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The block of C. is then cut under water by powerful knives or shears into sheets, from which the pieces sold by stationers may be shaped out, or from which C. bands or thread may be obtained. In the manufacture of square threads, mere cutting is had recourse to; and the delicacy of the operation may be understood when it is stated that one pound of C. will yield 32,000 yards of thread. The round thread elastic is prepared from C. which has been treated with about double its weight of bisulphide of carbon, containing about 5 per cent. of alcohol, which yields a soft material resembling in consistence bread-dough or putty; and this being squeezed through a series of small holes, is obtained in minute round threads, which are first received on an endless piece of velvet, and ultimately on an endless web of common cloth 500 to 600 yards long, during the transit of the threads across which, the solvent or bisulphide of carbon evaporates, and leaves the caoutchouc. When it is wished to weave these threads into cloth, they are wound upon bobbins, taking care to stretch the C. as much as possible, so as to deprive it, for the time being, of its elasticity; and after it has been woven into the cloth, a hot iron is passed over the fabric, and immediately the C. resumes its elasticity.

In the manufacture of water-proof clothing, or Mackintoshes (see MACKINTOSH), which was the first application of rubber on a large scale, the caoutchouc is made into a solution with spirits of turpentine, or other solvent, and spread upon the cloth; when thus coated, the fabric is pressed between heavy rollers. This variety of water-proof cloth has now, however, been almost entirely superceded by another kind made with vulcanised rubber, which we shall notice presently.

Vulcanised Caoutchouc.—Pure india-rubber is now used only to a limited extent in the arts, but it is applied in the vulcanised state to an almost endless variety of purposes. The remarkable change which caoutchouc undergoes when mixed with sulphur and heated, according to circumstances, from 240° to 310° F., was discovered by Charles Goodyear, in America, in 1843, and independently, about the same time, by Mr Thomas Hancock, in England. In the process of vulcanising, the rubber, as a preliminary step, is either torn into shreds or crushed into thin pieces by machinery, and afterwards washed. There are two principal kinds of vulcanised rubber, one hard and horny in its texture, the other soft and elastic. In the case of the former, the caoutchouc is mixed with about one-third of its weight of sulphur, and heated for several hours, the temperature finally rising to fully 300° F. For the soft kind of vulcanised rubber, on the other hand, a much smaller proportion of sulphur is required—namely, from 2½ to 10 per cent., and the heat to which it is subjected in the vulcanising chamber is considerably less. Usually, too, with this latter kind, the articles are made before the rubber is heated. The sulphur is commonly added in the ground state, but sometimes the rubber is treated with some solution containing this element, such as the bisulphide of carbon.

Although sulphur is the only essential ingredient required for vulcanising rubber, yet other substances are usually added. Thus, in the case of machinery belting, pipes, and some other articles, the silicate of magnesia (French chalk) is used to prevent adhesiveness. Litharge, or carbonate of lead, again, is frequently mixed with the rubber and sulphur for certain purposes; but there is really a long list of materials more or less used in preparing different qualities of vulcanised caoutchouc, each manufacturer using mixtures, the exact nature of which he is careful not to divulge. Asphalte, tar, lampblack, whiting, rosin, sulphide of antimony, and ground cork are some of the ingredients most commonly employed in this way. Belting for machinery, and some kinds of tubing, are formed of alternate layers of canvas and vulcanised rubber.

Natural caoutchouc, as already stated, is elastic, cohesive, impervious to gases, insoluble in water, and resists many chemical re-agents; but it loses its elasticity by cold, softens by heat, and is destroyed by many fixed oils. After being vulcanised, caoutchouc has its elasticity greatly increased, is not hardened by cold, and does not soften or become viscid at any temperature short of its absolute decomposition. Besides, it is barely soluble in turpentine, naphtha, and the other solvents of pure caoutchouc; nor does oil readily penetrate or soften it.

It would be a hopeless task to attempt to specify the many useful purposes to which vulcanised caoutchouc is applied, even if we had the space to spare. From the year 1843, when it was first made, to the present time, the various patented applications of it must be two or three thousand in number. The mere abridgments

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of the specifications connected with this material, issued by the English Patent Office, form a thick volume. Under the head GOLOSHES, will be found a brief description of the process of making india-rubber shoes. Water-proof coats are now made in a similar way, the mixture of rubber and vulcanising materials being pressed on the surface of any suitably woven fabric by heated iron rollers in a calendar. The coats are then cut out and the various pieces put together, without sewing, by some solvent, such as turpentine, which makes the edges adhere. They are afterwards heated in the vulcanising chamber. Both coats and shoes of this material have, however, the objectionable property of preventing the escape of moisture from the skin. Belting, buffers, wheel tires, washers, valves, pipes, fire-hose, and other engineering appliances, form a large branch of the rubber trade. For medical and surgical purposes, many articles are made of this material. Of such an apparently trivial matter as vulcanised rubber thread, one English firm turns out about 3000 lbs. per day, and another single small article—namely, tobacco pouches—is made in another factory at the rate of 3000 per diem.

Hard vulcanised rubber, termed vulcanite, and sometimes ebonite, is made into a great many small articles, such as combs, chains, bracelets, boxes, pen-holders, paper-knives, knife-handles, buttons, &c., as a substitute for materials like horn, bone, ivory and jet. As in the case of these substances it is formed into various objects by molding, cutting, carving polishing and other processes. Vast numbers of these articles are now sold, but some time must yet elapse before the quality of this material is thoroughly tested. The black color of vulcanite ornaments has still a tendency to turn gray, but the brittleness which was a fault of combs made of it a few years ago, seems to be overcome. With respect to objects of considerable size, vulcanite has been made into furniture, ornamental tiles, and even rails for railroads. A kind of vulcanite is now very largely employed as an insulator in electric cables, experience having shewn that there are certain objections to gutta-percha being used for this purpose.

There are some useful applications of india-rubber in the liquid or semi-liquid state, which it is worth while to note; thus, when melted at 398° F., and mixed with half its weight of slaked lime, it forms a useful cement or lute, which can be easily loosened, but it will dry and harden if red lead is added. A very tenacious glue is formed by heating caoutchouc, coal tar, and shell-lac together. It forms an ingredient in some special kinds of varnishes, and it also improves the lubricating qualities of mineral oils, when a small quantity is dissolved in them.

In Great Britain there are six or eight large india-rubber factories, each employing from 400 to 600 hands, besides a great number of smaller works. The manufacture of caoutchouc is also an extensive industry in the United States, and in some continental countries, especially France. According to an estimate made by M. Ballard in 1867, the annual French consumption of raw india-rubber was then 180,000 lbs., the value of which in a manufactured state was fully £3,000,000. This would indicate that the industry is more largely developed in France than in England. In most india-rubber factories a large number of the work-people are females; and with respect to the operatives engaged in them generally, there is this peculiarity, that as no great skill is required on their part, employment in such works has proved quite a boon to many persons who have never learned a trade.

CAP, in Ship-building, is a strong, thick block of wood fixed near the top of each mast; it has a hole to receive the upper end of the lower mast, and another to receive the lower end of the topmast, with eyebolts to aid in hoisting the topmast. There is also a C. of smaller size at the point of junction between the topmast and top-gallant-mast. When made of iron, the C. is called a *crance*.

CAP. See PERCUSSION CAPS.

CAP OF MAINTENANCE, or Dignity, is a cap worn by noble and royal personages on certain state occasions. Such a cap was sent by Pope Julius II. to King Henry VIII., for writing his book against Martin Luther.

CAPACITY, Legal, is such a condition of individuals, in regard to their natural qualities and actual position under the constitution of the country, as fits them for the application of the laws civil and criminal. Generally speaking, all persons have this legal capacity excepting *aliens*, persons *attainted*, *convicts*, *insane* persons, and to

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some extent also *infants*, *femmes covert* or married women, and persons under *duress*; see these heads. See also CONVEYANCE, CONTRACT, PLAINTIFF, PURSUER, DEFENDANT, SUIT.

CAP-À-PIE' (Fr. head to foot), in the military language of the middle ages, was applied to a knight or soldier armed at all points, or from head to foot, with armor for defence and weapons for attack.

CAPA'RISONED, in Heraldry. A war-horse completely furnished for the field is said to be caparisoned.

CAPE, in Geography, the extremity of a portion of land projecting into the sea beyond the general line of the shore. On a low sandy coast, a cape generally forms an obtuse angle, being merely a change in the trending of the land. On rocky shores, capes usually form acute angles, and are here sometimes called points or promontories.

CAPE BRE'TON, a rocky island of irregular form in British North America, stretching in n. lat. between 45° and 47°, and in w. long. between 60° and 61° 30'. It is separated from the peninsula of Nova Scotia by Chebucto or Chedabucto Bay and the Gut of Canso, contains 3120 square miles, with a population (1871) of 26,464. Its principal exports are pine, oak, birch, maple, fish, and coal. Though the island produces maize and other grains, yet it depends for its bread-stuffs chiefly on the United States. C. B., originally a French possession, was taken by the English in 1745; but being subsequently restored to France, it was again captured in 1758, and ceded in 1763. After having been for a time a distinct colony, it now forms part of the province of Nova Scotia. The towns are Sydney, Arichat, and Port Hood, the once famous Louisbourg, stripped of its fortifications, having become merely a village.

CAPE COAST CASTLE, the chief settlement of Great Britain in North or Upper Guinea, lat. 5° 5' n. and long. 1° 13' w. The place, as its name implies, is defended by a fort, or rather by three forts. It has a population of 10,000. During 1871, the external trade of the entire Gold Coast, C. C. C. being the capital, was as follows: imports, £364,672; exports, £327,012. Under the latter head, the principal articles were palm-oil gold-dust, tortoise-shell and maize.

CAPE COD, properly a narrow peninsula of Massachusetts, which, with a length of 65 miles, forms the south-east boundary of the great bay of that State. The northern extremity, marked by a revolving light 155 feet high above the level of the sea, is in lat. 42° 3' 40" n., and long. 70° 14' 48" w.

CAPE HATTERAS, a dangerously low point of North Carolina, United States, in lat. 35° 14' n., and long. 75° 30' w. It forms the eastern extremity of the insular banks of the same name, projecting virtually into the Florida Stream, and marking the spot where the coast-line abruptly turns from the direction of north-east to that of due north.

CAPE HA'YTIEN (formerly called *Cape Français* and *Cape Henri*), a seaport town, of the Island of Hayti, on its north coast, in lat. 19° 40' n., long. 72° 54' w. It is pleasantly situated on a small bay, partly encircled by hills, has wide and well-paved streets, and some handsome squares. A great portion of it, however, is in ruins, the effects of the revolutionary wars at the end of last century. Safe anchorage is found within the harbor, which, however, is rather difficult of access. C. H. carries on a considerable trade with the United States. Population stated at from 12,000 to 16,000.

CAPE HORN, or Hoorn, the most southerly point of America, terminating an island of its own name, in the archipelago of Tierra del Fuego. It is in lat. 55° 58' 40" s., and long. 67° 16' w., having a perennially antarctic climate, and being in itself merely a detached link, bare and rugged, of the chain of the Andes. It was discovered by Schouten, a native of Hoorn in Holland, about 90 years later than the Strait of Magellan, and since then the course of navigation of sailing vessels has been round the cape instead of through the strait.

CAPE LA HAGUE, a promontory of France, forming the north-west extremity of the peninsula of Cotentin, in the department of Manche. It juts out into the

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English Channel, opposite the island of Alderney, and about 16 miles north-north-west of Cherbourg, and 50 miles south of St Alban's Head, in Dorsetshire.

CAPE LA HOGUE, often confounded with Cape la Hague, is situated on the east side of the same peninsula. Here the united English and Dutch fleets defeated the French in 1692.

CAPE OF GOOD HOPE, popularly regarded as the most southerly promontory of Africa, though it is half a degree to the north of Cape Agulhas. The latter is merely a projection on a coast-line, which diverges inconsiderably from a parallel; but the former is really the turning-point from south to east on the voyage from Europe to India. This celebrated promontory is in lat. 34° 22′ s., and long. 18° 29′ e., being the termination of Table Mountain, which, as it recedes towards the bay of its own name, rises from the height of 1000 feet above the sea to that of 3582. The Cape (for so it is called by way of eminence) was discovered and doubled by Diaz, a Portuguese navigator, as early as 1486—six years before Columbus, in aiming at the same goal by a different route, led the way to America. But it was only in 1497 that Vasco da Gama realised the value of Diaz's discovery, by rounding it on his adventurous voyage from Lisbon to Calicut. The result was not merely to open a new channel for the traffic of the East, but it was also to transfer trading superiority from the republics of Italy to the states of Western Europe.

CAPE OF GOOD HOPE, a British colony, was so called from the cape on its south-western extremity. It was established by the Dutch in 1652, some attempts at a settlement having been previously made by the Portuguese. The former only intended it at first as an intermediate station between Holland and their East Indian possessions; and at first occupied only a small tract of ground on the slopes of Table Mountain, with some portion of the adjoining flats; but they had in their neighborhood scattered tribes of improvident natives, singularly feeble of purpose, and incapable of organisation on a large scale. The tide of immigration set in from Holland, and when the country was finally taken possession of by the British in 1806 (there having been a brief occupation of it from 1796 till 1803), the Dutch had extended their dominion as far to the east as the mouth of the Great Fish River, and from that point in a waving line across the country to the west, a little south of Orange River.

In entering upon the government of this large territory, the British found themselves face to face with a race of a totally different sort from that of the purposeless Hottentot—a people styled Kaffirs, mainly of Arab descent, consisting of tall, athletic, finely formed men, of warlike dispositions, with an incurable propensity to steal from any one, provided he was not of their own tribe, and particularly so if he was a foreigner. The inevitable result was a succession of wars—those, namely, of 1812, 1819, 1828, 1835—1836, 1846—1847, 1851—1852.

Cape Colony proper is bounded on the north by the Orange River and the Kei. But of late the area of this British possession has been greatly extended by the annexation of districts lying to the northward. Of these successive annexations the most important are that of British Kaffraria (see KAFFRARIA) in 1866; of Basutoland, lying in the upper basin of the Orange River, in 1868; of two vast districts across the Kei called Fingo-land and Noman's-land, now called Griqua-land East (q. v.), in 1875; of Griqua-land West, in 1876; and of the Transvaal (q. v.) in 1877. The area of Cape Colony proper is 181,592 sq. miles, and its pop. in 1875, 496,881. The area of the whole colony, with the newly incorporated districts, is estimated at 329,495 sq. m., and its pop. at 1,142,782.

The highest range of mountains within the colony is 9000 feet above the sea. The mountains keep at a distance from the coast-line of from 80 to about 100 miles, and receive different names in their course, such as the Stormberg, Sneeuwberg, Nieuwveld, Roggeveld, and Kamiesberg. Between this principal range and the sea on the east, there are two other ranges less continuous and regular, the intermediate one generally more distant from the first than they are from each other.

South Africa being not far from the region of the trades, south-east winds prevail, especially in the summer time; the only other wind that may be said to blow is that from the north-west, which prevails during the colder months. But whichever of these two winds predominates—the one bearing a supply of rain from the Indian Ocean, the other, if less frequent, more richly laden from a part of the

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Atlantic nearer the line than the country which it fertilises—it fails to deposit its stores on the opposite side of the principal water-shed which crosses its path. Hence the curious fact of the transposition of seasons in the same latitude. As the harvest in such latitudes depends more on the supply of rain than anything else, people are reaping on the one side of the country whilst they are sowing and planting on the other. Certain parts of the country are liable to long-continued droughts, because while very heavy rain-falls take place, the rain is confined to a particular part of the year. The country, however, is admirably adapted for the storage of water. In many places one meets with the successive beds of dried-up lakes, with a narrow outlet at the lower ends, through which a periodic stream flows. By closing up this outlet, artificial lakes or dams may be formed to almost any extent, and of unlimited number; and from the steepness of the slope, the lands lower down admit easily of being laid under water.

As regards minerals, the diamond fields are in Griqua-land (q. v.), till recently beyond the limits of the colony, and in the Free State. In 1874, the lieutenant of West Griqua-land issued an order for the better management of diggings and mines of precious stones and minerals, in which he requires that miners shall have a certificate, dealers a license, and the mines be under official inspection. This ordinance created a great outcry against it by a great body of dealers; but it seems necessary that such protection should shield the weak and the dealer who wishes to trade according to recognised law. Gold is confidently reported to have been found in the Trans-Vaal in payable quantities; but the only mineral within the colony which has greatly added to its wealth is the rich copper ore found in Namaqua-land.

There is in the colony almost a total want of navigable rivers, but the system of railways is rapidly extending. Already the copper mines are connected with Port Nolloth; the line which connected Cape Town with Wellington has been carried forward to Worcester. When completed, it will be a trunk line extending from one end of the colony to the other. Another line has been begun at Port Elizabeth, in order that it may pierce the gaps in the mountain regions, and open up the way to the country behind them. A line is projected from East London with a similar view. The shipping at Cape Town is now secure by a breakwater and docks. The same cannot be said of Port Elizabeth, East London, and the Kowie; but measures are being taken which, it is hoped, will result in making these also safe from the fierce south-east winds.

This splendid country is at present occupied by an assemblage of very varied races. The Portuguese were the first Europeans who landed here. The Dutch are probably still the most numerous, notwithstanding the exodus to the Orange River Free State, prompted by the slave question. Next in number are the English, by whom some parts of the country, particularly in the east, are occupied almost exclusively. The French are also largely represented, many refugees having settled in it subsequently to the Revocation of the Edict of Nantes, but they are now nearly absorbed in the Dutch population. They were at first located principally in the west, where they introduced the culture of the vine, but their names are now found in almost every part of the land. There is also a considerable importation of Germans, who have been settled on the frontiers adjoining the Kaffirs for defensive purposes. As regards the colored inhabitants, large numbers of Kaffirs have been retained in the districts which they formerly occupied, and others have come into the country as shepherds and servants. There is a large number of people of Malay origin in and around Cape Town, and in towns on the east coast, who gain a livelihood as fishermen, porters, and the more laborious sorts of skilled labor. There are a few Mozambiqueres and Hottentots, besides a number of half-castes, to whom the name of Africander properly belongs.

The constitution of the country, after several changes, was fixed in its present form, by an act passed by the colonial legislature in 1872, which provides for responsible government. There are two elective chambers, the Upper House, consisting of 21 members, 11 of whom represent the western province as one constituency, and 10 the eastern. They are presided over by the Lord Chief-justice. To the Lower House, or House of Assembly, two representatives are appointed by each division of the colony, with the exception of the Cape district, which, as being more populous, returns four. They amount in all to 68, and are presided over by a speaker of their own choice. The 16 electoral divisions into which the western and eastern provin-

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ces are each divided, are again subdivided for magisterial and fiscal purposes. The governor carries on the administration along with a ministry of 5 members—the Colonial Secretary, the Attorney-general, the Treasurer-general, the Commissioner of Crown Lands and Public Works, the Secretary for Native Affairs. The supreme court, which has its sittings in Cape Town, has two judges besides the Lord Chief-justice. Another court holds its sittings in Graham's Town, in which there are two judges only, but there lies an appeal to the supreme court. In other parts of the colony, justice is administered by the judges going on circuit. A colonial university has recently been founded.

Wool is the staple product of the colony; ostrich farming and the culture of the vine are carried on. The following tables shew the exports and imports of the colony for recent years:

	Exports in Tons.	In Value.
1870	182,935	£2,453,768
1871	172,002	3,408,635
1872	228,614	4,757,494
	Imports in Tons.	**In Value.**
1870	186,204	£2,352,043
1871	176,625	2,585,298
1872	245,517	4,388,728

In 1875 the value of exports was £4,393,325; of imports, £5,762,743. The coasting trade has increased in a much higher proportion. The revenue shews steady increase:

	Annual Revenue.
1871	£ 784,663
1872	1,039,887
1873	1,232,756
1874	1,518,008

CAPE RIVER, properly *Vaunks*, taking its popular name from the proximity of its mouth to Cape Gracias a Dios, on the east reach of the Mosquito shore in Central America. After a generally north-east course of nearly 300 miles, it enters the Caribbean Sea, about lat. 14° 59 n., and long. 83° 11′ w., being navigable for a considerable distance upwards.

CAPE ST VINCENT, a headland forming the south-west extremity of Portugal, in lat. 37° 2′ n., long. 9° w., is celebrated on account of two naval battles in which British ships were engaged, fought off it, one in 1693, the other in 1797. In the former, Admiral Rooke, who with some 20 English and Dutch men-of-war, was convoying a fleet of some 400 merchantmen, was attacked off this point by the French Admiral De Tourville, and after a running fight lost several ships, and 80 merchantmen. In February 1797, Sir John Jervis, with a fleet of 15 sail, gave battle to a Spanish fleet of 27 sail of the line, and defeated them, capturing four ships and driving the rest into Cadiz Bay, where they were blockaded.

CAPE TOWN, the capital of Cape Colony, faces Table Bay to the north-east, is flanked by the mountain Lion's Head, with its continuation to Lion's Rump or Signal Hill, and has behind it the precipices of Table Mountain. Its latitude is 33° 56′ s., its longitude 18° 28′ 7″ e. Its mean temperature 58·3° F. for winter, 76·6° for summer, and 67·3° for the whole year. Pop. 40,000. Two lines of passenger wagons connect it with the diamond fields, which are reached in about a week. railways with Worcester, &c., and electric-telegraphs with the principal parts of the colony. It is the principal port for the coasting trade as well as foreign exports and imports; is well supplied with fish, as well as meat, dairy produce, and every sort of fruit and vegetables, at a moderate price. It has a supply of fresh water of excellent quality. C. T. is the seat of the government, the supreme court, and a college and university. All the churches are well represented—the English Episcopal, the Roman Catholic, and representatives of Presbyterians, Lutherans, Wesleyans, Congregationalists, a Free Church (chiefly an off-break from the Dutch Church), a Jewish synagogue, and a Mohammedan mosque, the Malay population being of that faith. There are also banks and insurance offices. The town is built upon a double slope, which subsides

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into a plain on the north-east side. Its streets, at right angles to each other, are lined with houses, for the most part of an Eastern type, with heavy walls, flat roofs, and large public apartments, interspersed with increasing numbers of shops and warehouses, of the sort to be met with in England.

The most remarkable structures are the breakwater, with the docks and patent slip; the castle, with its outworks and bastions; the barracks for the military, the Roman Catholic Cathedral, with a few other places of worship; the museum and library, with the Botanic Gardens in front; and between it and Government House, a park, with its avenues shaded by stately oaks. Out of town, a little distance to the north-west, is Somerset Hospital, and the Royal Observatory, about two and a half miles to the north-east.

C. T. returns four members to the colonial assembly. The municipality is administered by a town-council of 18 members—three from each of six separate districts—and is presided over by a mayor elected annually by the council. In September 1872, it possessed 44 vessels, and their united tonnage was 4416. There are 5 newspapers in C. T., which are issued three times a week; 2 bi-weeklies, 1 weekly, 1 fortnightly, and 3 monthly magazines.

CAPE VERD, the most westerly headland in Africa, jutting out into the Atlantic Ocean, between the rivers Gambia and Senegal in lat. 14° 43′ n., long. 17° 34′ w. It was discovered by the Portuguese about 1445, and is said to have derived its name from a group of gigantic baobab-trees which adorn its summit.

CAPE VERD ISLANDS (*Ilhas Verdes*), a group of islands belonging to Portugal, lying in lat. 14° 45′—17° 19′ n., and long. 22° 45′—25° 25′ w., and distant about 320 miles west of the cape from which they take their name. The principal islands are ten—viz., Santiago, the largest and most important, Fogo, Brava, Maio, Boavista, San Nicolão, San Antonio, San Vicente, San Luzia, and Sal. There are besides four islets, barren and uninhabited. The total area is about 1700 square miles, with a population (1872) of 76,000. The islands are all very mountainous, and owe their origin to the action of submarine volcanoes. The highest elevation is reached in a volcanic peak, 9157 feet above the sea, on the island of Fogo, and which is still active. The climate is unhealthy during the rainy season. Though water is deficient, vegetation is luxuriant, yielding African and Southern European products. Sugar, cotton, coffee, tobacco, and indigo are grown, and the trade in archil, monopolised by government, has in some seasons yielded as much as £24,000. Several of the European domestic animals thrive well. Turtles are abundant in the surrounding seas, and whales also are fished by British and American vessels. Amber is found on the coasts, and great quantities of salt formed by solar evaporation is obtained from the lagunes on the shores, especially on the island of Sal. The inhabitants, who are mostly negroes, indolent but harmless, speak a corrupted form of Portuguese, called Lingua Creoula. The revenue for 1874—1875 was estimated at about £43,000, and the expenditure for the same year at £42,000. The islands are under a governor-general, exercising both civil and military authority. The chief ports are Porto Praya, on the island of Santiago, and Porto Grande, the best harbor in the whole group, on the island of San Vicente. The islands were discovered about the middle of the 15th c. by the Portuguese, who shortly after colonised them.

CAPE WRATH, a pyramidal promontory of unrivalled wildness and grandeur, forming the north-west extremity of Scotland and of Sutherland, and running out into the Atlantic, in lat. 58° 38′ n., and long. 4° 58′ 5″ w. It consists of gneiss, with beds of dark hornblende rock, is intersected by complex granite veins, and presents deep fissures and tall pinnacles. From it a reef of rocks, perforated with arches and caverns, juts out into the sea. Off the cape is Stag Rock, a pillar 200 feet high. C. W. is 600 feet high, and there is a lighthouse near it, 400 feet above the sea, and seen 25 miles off. From the cape can be seen N. Rona, 50 miles off; Hoy Head, Orkney; the Butt of Lewis; and a grand panorama of mountains in Sutherland.

CAPEFIGUE, Babtiste Honoré Raymond, a French publicist and historian, was born, 1802, at Marseille. He studied law at Aix, and in 1821 proceeded to Paris, for the purpose of completing his juridical course, but soon betook himself to journalism and authorship. He held a post in the foreign office until 1848. This, however, did not interfere with his amazing activity. Besides contributing extensively to many of the Parisian journals, he has "manufactured" not less than a hundred vol-

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umes of history—not, indeed, intrinsically valuable, but indicating wonderful facility in the use of the pen. The best is the "Histoire de la Restauration" (3d edit. 1843). He has published of late years many interesting biographical works.

CA'PELIN (*Mallotus Grœnlandicus*), a small fish of the family of *Salmonidæ*, extremely abundant on the coasts of Newfoundland, and much used as bait in the cod-fishery. It is also, in a dried state, an article of commerce, and is imported, although not very largely, into Britain, where it sometimes appears on the breakfast or supper table. Its flavor, which is very agreeable, suggests to most persons the idea of its belonging to the herring rather than the salmon family. It is nearly allied to the smelt, but the teeth are smaller and more numerous. It is the only known species of its genus.—Shoals of capelins arrive periodically on the coast of Newfoundland, the vast numbers changing the very color of the sea.

CAPE'LLA, a bright star of the first magnitude, on the left shoulder of Auriga. C. is also called Capra or the *She-goat*, a name also sometimes given to Capricorn.—The poets fable C. to be Amalthea's goat, which suckled Jupiter in his infancy.

CAPELLA. See A CAPELLA.

CAPELLA, Martianus Mineus Felix, a learned author belonging to the second half of the 5th c., was born in Africa, but where is not definitely ascertained. Of his life nothing whatever is known. The work which has preserved his name to posterity is the "Satiricon," a kind of encyclopædia, highly esteemed during the middle ages as a work of reference. It is written in a medley of prose and verse, and is full of curious learning, but possesses no literary value; the style has all the bombastic pomp of the African school of later Latinists. It consists of nine books. The first two consist of an allegory, "The Nuptials of Philology and Mercury," while the remaining seven are devoted to the "liberal arts," grammar, dialectics, rhetoric, geometry, arithmetic, astronomy, and music. The first edition of the "Satiricon" appeared in 1499, under the care of Franciscus Bodianus; the best in 1836, under the care of U. F. Kopp.

The book on astronomy is remarkable as containing a hint of the true theory of the solar system. Mercury and Venus are there declared to move round the *sun*, and not round the *earth*; and there relation to these bodies is properly explained. Now as Copernicus knew C., and quotes from him, it is not unlikely that he derived the first idea of his doctrine from this writer.

CAPERCAI'LZIE, Capercaillie, Wood-Grouse, or Cock of the Woods (*Tetrao Urogallus*), the largest of the gallinaceous birds of Europe. It is a species of Grouse (q. v.), almost equal in size to the turkey; the male, which is the largest, sometimes weighing fifteen pounds or more. In figure and appearance, it much resembles the black-cock, but the tail of the male C. is rounded, and not forked, as in that species; and the male C. has the feathers of the head elongated. The general color of the adult male is brownish black, minutely freckled with grayish white, and with lighter brown; the quill-feathers dark brown; the tail feathers nearly black, some of the longer tail-coverts on the sides of the tail tipped with white; the chest is of a shining dark green; there is a small scarlet patch of naked skin above the eye, and the bill is whitish. The general color of the female and of the young males is dark brown, freckled with yellowish brown; the front of the neck and the chest are yellowish chestnut; and the feathers of the under parts are generally edged with white. The C. has the feet feathered to the toes, but the toes are naked. It is an inhabitant of pine-woods; feeds on berries, seeds, worms, insects &c., and on the young shoots of the pine, greatly preferring the Scoth fir to the spruce; occasionally also eating, at least in winter, the buds of the birch and other trees. The female makes her nest on the ground, and lays from six to twelve eggs, of a pale reddish or yellowish brown, spotted with other shades of brown, and more than two inches long. Like the black-cock, the C. is polygamous.—The geographical distribution of the C. is very extensive: it is found on the pine-covered mountains of all parts of Europe, from Spain and Italy almost to the North Cape, and is abundant in the northern parts of Asia. It was at one time found both in Scotland and Ireland, but was completely extirpated about the end of the 18th or beginning of the 19th century. Through the exertions, however, of the Earl of Fife and other proprietors of great Highland estates, but particularly of the Marquis of Breadal-

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bane, it has again been restored to the forests of the Highlands of Scotland. The C. is very capable of domestication, and breeds readily, if allowed the range of a space containing a few pine-trees. It is much esteemed for the table. The market of Stockholm is well supplied with it in winter; and since the establishment of steam communication, it has been regularly brought from Scandinavia to London.

CAPE'RNAUM, meaning "the field of repentance," or "city of comfort," was in the time of our Saviour a favorite and exalted city, and one of the three which he upbraided "because they repented not." It was situated on the north-western coast of the Sea of Galilee, or Lake of Gennesareth. It is now a heap of ruins, extending more than a mile along the shore and back towards the mountains, so ever-grown with grass and bushes, that it is difficult to move among them. C. is called by the natives of Syria Tell-hûn.

CA'PERS are the pickled flower-buds of the caper-bush (*Capparis Spinosa*). They have an agreeable pungency of taste, with a slight bitterness, and have long been in very general use as a condiment and ingredient of sauces, along with boiled mutton and other kinds of food. They possess medicinal properties, being antiscorbutic, stimulant, and laxative. They are of a grayish green color, to improve which, however, copper is sometimes used, as in the case of gherkins and other pickles, rendering them poisonous. This can be detected by thrusting a polished iron rod into the vessel which contains the C.; the surface of the rod soon becoming coated with copper, if it is present.—The caper-bush is a native of the south of Europe, and other countries near the Mediterranean. It is extensively cultivated in some parts of the south of France and in Italy, but most of all in Sicily. It succeeds in the open air even at Paris, but in Britain requires the aid of artificial heat. It is a trailing, rambling shrub, loving dry places, and often growing on rocks or walls, adding a fresh charm of beauty to many an ancient ruin. It begins to flower early in summer, and continues flowering till winter. The buds are gathered every morning, and are immediately put into vinegar and salt: at the end of the season, they are sorted according to their size and color, the greenest and least expanded being the best, and are again put into vinegar, the finest being sent to the market in bottles, the coarser in small barrels. The fruit, which is a small berry, is also pickled in the south of Italy. The flower-buds of the caper of Mount Sinai (*Capparis Sinaica*) are pickled like those of the common species; the seeds are also pickled, and are called by a name signifying Mountain Pepper. The fruit of *Capparis aphylla* is made into a pickle in India. Species of *Capparis* are numerous in India, the warm parts of America, &c. See CAPPARIDEÆ.—Various substitutes for C. are sometimes used, as the flower-buds of the Marsh Marigold (*Caltha palustris*), those of the Indian Cress (*Tropæolum majus*), and those of the Bean Caper (*Zygophyllum Fabago*).

CA'PETIAN DY'NASTY, the third Frankish dynasty, founded about the close of the 10th c., when Hugo Capet ascended the throne. The surname CAPET has been derived from *cappetus*, "a monk's hood," because, though duke of France, Hugo was also abbot of St Martin de Tours. On the death of the last Carlovingian monarch (Louis V., surnamed *Le Fainéant*—i. e., the Slothful), Hugo, the most powerful of French vassals, seized the throne, and by moderation and prudent concessions made to the authorities of the church, as well as to his brother-nobles, who had made themselves independent, contrived to retain the power he had seized. He was crowned at Noyon, July 3, 987. In order to establish his dynasty, Hugo caused his eldst son Robert to be crowned as co-regent, 988. Capet first made Paris the capital of France. He died in 996; when his son Robert, a well-disposed but feeble ruler, ascended the throne, who died 1031, beloved by his domestics, but despised by his neighbors and vassals, forgotten by his people, and permitting all power to vanish from his hands. It was during his long lethargic reign that the towns and cities of France began to form themselves into corporations, to act in their own name, to contract obligations, and lay the foundations of middle-class freedom. In many other ways, also, the happy dissolution of royal power sowed the seeds of national prosperity. Robert's sons were Henry, who succeeded him, and Robert, ancestor of the older House of Burgundy.

Henry left two sons—Philippe I., who ascended the throne, and Hugo, who distinguished himself in the first crusade (1096), and died 1102. Philippe, under the re-

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gency of Baldwin, Count of Flanders, came to the throne when only eight years old, and first really began to reign after the death of the regent (1066). He took hardly any part in the great movements and events of his times, but supported Robert, son of William the Conqueror, in his rebellion against his father. Consequently, William commenced an expedition against Paris, and would probably have dethroned Philippe, but died in 1089. By his dissolute course of life, Philippe fell under a sentence of excommunication issued by Pope Gregory VII. in 1094, and, after doing penance, died in 1108.

His successor, Louis VI., surnamed *Le Gros*, had, during Philippe's lifetime, been active in the support of the crown, and now extended the royal power which had been almost entirely confined within the duchy of Paris. By bold and vigorous measures he brought everywhere his vassals into real subjection to his authority, liberated the towns from baronial oppression, partly abolished feudal bondage, and extended considerably the jurisdiction of the crown. His life was an almost incessant contest with the small and turbulent vassals who had rioted in the license afforded them by the weakness of his predecessors. He died 1137, leaving a numerous family.

As his eldest son and co-regent, Philippe, had died during the reign of Louis, his second son, Louis VII., *le Jeune*, now came to the throne, and by his marriage with Eleanor of Guienne, heiress of the Duke of Aquitaine, gained a considerable accession to the power of the crown. He engaged in the second crusade, and led 100,000 men to the East; but was unsuccessful, and returned to France after an absence of two years. In 1152 he divorced his unfaithful wife Eleanor, who subsequently married Henry Plantagenet, afterwards Henry II. of England. This marriage made Henry far more powerful than the king of France, and Louis would probably have lost his crown had not the disturbances in England—the quarrels with Becket and with his own sons—proved sufficient to occupy Henry's attention. Louis le Jeune died 1180.

Philippe Auguste (q. v.), his son by a third marriage, ascended the throne ten months before his father's death, and proved himself the most able of the Capetian dynasty. Against the wishes of his family, he married Isabelle of Hainault, great-granddaughter of the last of the Carlovingians, and thus finally united the two houses. His successor, Louis VIII., who died 1226, was said to have been poisoned by the Count of Champagne, paramour of the queen, Blanca of Castile. Louis VIII. was followed by his son Louis IX. (SAINT LOUIS, q. v.), who died at Tunis, 1270. Of the eleven children of St. Louis, the eldest, Louis, died aged 16, while the youngest, Robert, became the founder of the Bourbon dynasty (see BOURBON). The second son, Philippe III., *le Hardi*, succeeded his father, and, by the disease of two brothers and two uncles, acquired possession of Poitou, Auvergne, and Toulouse. His son (Philippe IV., *le Bel*) acquired by marriage Champagne with Navarre. These acquisitions, and his attempt to secure for his uncle Charles of Anjou, the throne of Naples, involved Philippe III. in contentions with Italy and Spain. He subjugated Navarre, 1276, and died of the plague in 1285. Philippe IV., *le Bel*, succeeded to the throne when seventeen years old. He soon gave signs of a despotic character, plundered the estates of the church, defied papal authority, persecuted the order of Templars (q. v.), and removed the residence of the pope to Avignon. The atrocious act of burning the grand-master, with sixty knights, of the order of Templars, after they had recalled all the confessions drawn from them by torture, has left an ineffaceable blot on the name of Philippe le Bel. He died 1314, and left three sons and a daughter.

The eldest son, Louis X., *le Hutin*, who ascended the throne, displayed remarkable weakness of character, and died 1316. He was succeeded by Philippe V., *le Long*, second son of Philippe le Bel, who died without issue. By his death (1322), the crown came to Charles IV., *le Bel*, third son of Philippe le Bel, and the last of the direct line of the Capetian kings. He died 1328, leaving by his third marriage a daughter, named Blanche, who married Philippe, Duke of Orleans, and died (1392) leaving no issue. Isabelle (daughter of Philippe le Bel) married Edward II. of England, and was mother of Edward III., who consequently took the title of king of France, which was retained by the kings of England until the reign of George III.; but Philippe of Valois, cousin of the last Capetian king, and grandson of Philippe

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III., *le Hardi*, claimed the crown of France by virtue of the Salic law, and so founded the dynasty of Valois (q. v.).

CA'PIAS, in the practice of the English common law, is a writ directed against the person, and so called from the commencement of the process in the old Latin form. It has various applications, the principal of which are the following:

CAPIAS AD RESPONDENDUM is a writ which a plaintiff, after action, may sue out upon affidavit against a defendant who, there is reason to believe, is about to quit England, and against whom there is a cause of action to the amount of £50 or upwards, whether as matter of contract or of damage. The writ directs the sheriff to arrest the defendant, who remains in custody on such arrest until he shall have either given a bail-bond with reasonable sureties. This arrest is only when the defendant's absence will prejudice plaintiff.

CAPIAS AD SATISFACIENDUM, or Ca. Sa. This is one of the writs by which a plaintiff can put a judgment recovered by him in execution. The object of it is to imprison the debtor till satisfaction, when imprisonment is still permitted. See on the subject of Capias generally, APPREHEND, ARREST, ATTACHMENT, EXECUTION, and BAIL.

CAPILLAI'RE, a medicinal syrup, used as a pectoral in chronic catarrhs, is prepared by adding sugar and orange-flower water to an infusion of the fern called MAIDENHAIR (q. v.), or by pouring boiling syrup on the fern.

CA'PILLARIES. The tubes which convey the blood from the left side of the heart to the various parts of the body are termed arteries, while those which return it to the right side of the heart, after it has discharged its various functions in the body, are known as veins. The name of capillary (from *capilla*, a hair) is given to the minute vessels which form the connection between the terminal branches of the arteries and the commencements of the trunks of the veins. These little vessels are of various sizes, some admitting only one blood-corpuscle at once, while others are large enough to allow of the simultaneous passage of two, three, or more corpuscles. In the muscular tissue their average diameter is 0·003 of a line; they are smallest in the brain, and largest in bone. Their arrangement varies in different parts. The various arrangements have been discovered by the microscopic examination of tissues that have been successfully injected with colored fluids.

The circuation of the blood through the C. may be readily seen in the web between the toes of the hind-foot of the frog, in the tongue of that animal, in the tail or gills of the tadpole, in the wing of the bat, etc.

The principal uses of the capillary system of vessels will be noticed in the articles on DIGESTION, NUTRITION, RESPIRATION and SECRETION.

CA'PILLARY A'CTION. When a clean glass tube with a fine bore, open at both ends, is plunged into a liquid capable of wetting it, such as water, the liquid is found (1) to rise in the tube above the level of its surface in the vessel containing it; (2) to rise the higher in the tube above that level the finer its bore is; (3) to stand above the general level in the tube where it approaches the sides, so that its upper surface in the tube is curved and concave. When a similar tube is plunged into a liquid incapable of wetting it, such as mercury, phenomena of a precisely opposite nature are presented. The liquid stands in the tube below the level of its surface in the vessel; and where it approaches the sides of the tube, it stands below its general level in the tube, so that its upper surface is curved and convex, the convexity and depression in the tube increasing with the fineness of its bore. While such is the case with the two classes of liquids described, there are others on which fine tubes have no action, so that they stand in such tubes at the same level as in the vessel, and with plane upper surfaces. These are the leading phenomena to be explained by what is called C. A., the tubes with fine hair-like bores being called capillary tubes, from Lat. *capillus*, a hair. The phenomena, however, though connected by name with such tubes, are not dependent on them, but may be produced without their intervention by any contrivance which gives room for the so-called capillary action. For instance, if two plates of glass with parallel faces be placed together with two of their edges in contact, and the two opposite be separated a very little by a fine wedge; and then if they be put standing with their common edge vertical in a trough containing a little colored fluid capable of wetting the glass,

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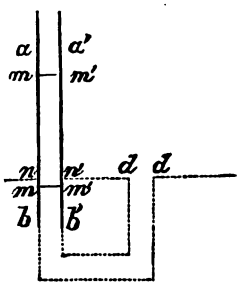
the fluid will rise between the plates, the height attained at any point being inversely as the distance between the plates at that point, so that its upper surface will be a curve of the kind known as the hyperbola—being highest near the common edge, and lowest near the edges separated by the wedge. If the same apparatus be placed in a trough containing mercury, the mercury will be depressed between the plates till its upper surface forms a hyperbola convex to the zenith.

To understand the peculiar action producing these phenomena, it must be kept in view that the surface of a fluid at rest under gravity is a horizontal plane (see HYDROSTATICS) and that this plane is maintained by gravity and the mutual attractions of the particles of the fluid mass. Suppose now a fluid at rest in a vessel to have a foreign body, such as a capillary tube, suddenly plunged into it, and separating as by walls, a portion of the fluid from the rest. By cohesion (q. v.), the fluid particles inside the tube will be held on—drawn downwards—to the mass of the fluid, while by adhesion (q. v.) they will be drawn upwards towards the sides of the tube. By the ordinary action of gravity, as in tubes of a large size, the fluid will at once tend to rise in the tube to its level in the vessel. Whether it will succeed in doing so, or whether it will rise still higher, must depend on the adjustment of the forces of cohesion between the fluid particles and their adhesion to the solid of the tube. The relation of these forces may be generally explained as follows: Let *mm'* be the surface of the column, *mn*, of a liquid contained in a space, *abba'*, above or below the surface, *nn'*, of the external liquid. There being equilibrium between the liquid in the tube and in the vessel, any line of liquid particles may be taken and supposed to be detached from the rest and enclosed in a tube, without altering the forces exerted. Let the line included between the dotted lines be conceived so detached. The action which the particles of the liquid in the tube exert on each other, or sustain from the sides of the tube, have no tendency to make the liquid move either up or down. But the column, *mb*, in the tube has some action exerted on it by the sides of the tube above the surface, *mm'*. Let A, depending on the force of adhesion, represent this upward action of the tube. The column is also attracted downwards By the detached column *bc*, i. e., by the liquid in the imaginary tube. Let C, depending on the force of cohesion, represent this downward action of the liquid. Also the part *bc* of the liquid is attracted upwards by the tube *ab* by the attraction which we have represented by A. Thus the liquid column is acted on by two upward actions —2A, and a downward action, C. The whole force acting on it, excluding gravity, is 2A—C. Gravity would make the liquid rise to *nn'* at once, i. e., till it stood as high in the tube as in the vessel. Whether, then, it will rise above *nn'*, or be depressed below it, must depend on whether 2A is greater than C, equal to it, or less than it. If 2A — C, the liquid will stand in the tube at the level *nn'*, as if these forces did not act at all. If 2A be >C, then 2A—C will be an upward force, and the column will be raised above the level *nn'*. If 2A be <C, then 2A—C will be a downward force and the column be depressed.



Regarding the forms of the upper surfaces of columns of liquid in capillary tubes, it can be demonstrated mathematically that the same relations of the forces of attraction and cohesion, which determine the elevation or depression of the liquid column determine, also, the form of its upper surface in the two cases of elevation and depression. In fact, the case of the elevated column resembles that of a cylinder of any very elastic substance (so elastic as to suffer change of form very readily under pressure), supported wholly by *the rim* at one of its ends; or, what is the same thing, by vertical forces acting in the lines composing its outer surface. Gravity draws down the concentric shells, of which the cylinder may be conceived to be composed, the further the more remote they are from the outermost, or that which is directly supported, the central rod being the most depressed. It would appear that the form of the surface has an important bearing on the cause of the production of the whole phenomena.

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The third fact of observation—viz., that the liquid rises higher or is more depressed the finer the bore of the tube—is thus explained in the case of elevation: Since the action of adhesion is confined to the superficial layer of the fluid, and between the same substances is, *cæteris paribus*, constant in quantity for an equal extent of surface, the wider the tube the shorter must be the column sustained, as the contents of the column raised by cohesion increase more rapidly when the bore increases than the attracting surface. The column increases with the square of the diameter of the tube, while the attracting surface increases only with the diameter. The height, therefore, is inversely as the breadth of the tube. That the depression must increase as the bore of the tube diminishes, appears from reasoning similar to that employed in the case just discussed.

The degree of elevation varies with the nature of the fluid, the variation depending partly on the difference of cohesion between the particles of the fluid, and partly on the difference of adhesion between the fluid and glass. It is found that temperature affects these forces so that the height diminishes as the temperature rises.

The depression of mercury in a fine glass tube makes it necessary to use a correction in reading off the height of the mercurial column in the barometer, which, owning to it, stands always a little lower than the height due to the atmospheric pressure. Experience, however, has shewn that that the capillary depression is nearly one-half less in tubes which have had the mercury boiled within them, than in unboiled tubes, as by boiling a film of air, which in unboiled tubes adheres to the glass, is expelled. By widening the bore of the tube also, the error may be diminished so as to be neglected altogether. In a tube of ¼ inch in diameter, in which the mercury has been boiled, the depression is 0·02 inch, while with a similar tube of ½ inch diameter it is only 0·008. The depression of mercury, it is found, is slightly increased by an elevation of temperature. It may be mentioned that in reading off the level of mercury in any instrument, such as the barometer, the height should be taken from the convexity of the curve. If the liquid used in the instrument, however, wets the tube, the height should be taken from the concavity.

As already stated, the phenomena are not dependent on the intervention of tubes; any capillary cavity suffices to produce them. When two light bodies, such as two bits of cork, are left to float on water, near each other, they soon come together, moving at last with a rush. This is sometimes given as an example of the gravitation that draws the planets to the sun; but it is really owing to this capillary action that we are considering. When the liquid wets the floating bodies, it rises slightly all round them, and this sustained liquid hangs as a weight on them on all sides. So long as it rises equally, there is no motion; but when the bodies come near each other, the space between them becomes like part of the inside of a capillary tube, the water rises higher there than on the other sides, and the bodies move towards the sides that are most strongly pulled. When the floating bodies are not wetted by the liquid, the surface between the two bodies is depressed, as that of mercury is inside a glass tube, and the bodies descend, as it were, down the opposing slopes, and meet in the bottom of the hollow. If one of two bodies floating on water is smeared with oil so as to prevent the water from adhering, instead of coming together, the two will recede from each other, for reasons analogous to the above.

C. A. plays a most important part in nature in a great variety of ways. An instance of its employment by man is seen in the wicks of lamps and candles, which, being composed of fibrous materials, furnish hair-like channels by which the melted oil is elevated to the flame, and supplied as fast as it is consumed. C. A. influences the circulation of fluids in the porous tissues of animals, and it is the principal mode in which water, with the various substances which it holds in solution, is supplied to the roots of growing plants. It is through it that in summer droughts moisture is raised to the surface for the maintenance of vegetable life. C. A., too, affects many phenomena usually considered under the head DIFFUSION (q. v.) of fluids and gases. The reader, on referring to the article OSMOTIC ACTION, will also see that it enters into the explanation of the phenomena known as exosmose and endosmose.

A familiar illustration of C. A. is furnished when one end of a towel happens to be left in a basin of water, while the other hangs over the side below the level of the water; the basin is soon emptied of its contents. It is important to observe that, although the towel will become wet, not a drop will flow from it, unless the outside end reach below the level of the water in the basin. In this respect C. A.

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resembles that of the syphon. And this shews the error of supposing that water may rise through the earth by C. A., and flow out as springs at a higher level than the source whence it is drawn.

Some very interesting experiments have been made by M. Poiseuille ("Ann. de Chimie et de Phys." III. xxi. 27) concerning the flow of liquids through capillary tubes, the results of which must here be stated. It appears that when the tube exceeds a certain length—which is greater as the bore increases—the following laws regulate the rate of efflux of the liquid, the efflux taking place under pressure: 1. The flow increases directly as the pressure, so that under double the pressure, double the amount is discharged in equal times. 2. In tubes of equal diameter, the quantities discharged vary inversely as the length of the tube. If a tube 2 inches long discharge 100 grains in 5 minutes, a tube 4 inches long will only discharge 50 grains. 3. In tubes of equal lengths, but different diameters, the flow is as the fourth power of the diameters. If one be $\frac{1}{50}$ of an inch in bore, and the other $\frac{1}{100}$, the efflux from the larger will be 16 times as great as from the smaller. It is further found that the efflux varies with the nature of the liquid, the material of the tube not appearing to affect the result in any great degree. No law of the rate of efflux has yet been discovered, depending on the density, capillarity, or fluidity of the fluids.

It may be mentioned, in conclusion, that the tubes to be used in the experiments on capillarity should be perfectly clean and dry. If wetted, the film of moisture on the tube forms a new tube, and the action will be the same as with a tube of the substance forming the film. The reader should consult Miller's "Elements of Chemistry," and J. Clerk Maxwell's "Theory of Heat," where the phenomena are treated from a different point of view; the phrases "superficial energy" and "superficial tension" being substituted for "capillarity," and the hypothesis of molecular attraction being avoided.

CA'PITA, Distribution per—i. e., distribution by heads, or by numbers, equally—occurs in the case of several claimants to the property of a deceased person, all severally claiming in their own right, in equal degree of kindred, and not under any right of representation. See INHERITANCE, SUCCESSION.

CA'PITAL (Lat. *capitulum*, from *caput*, the head), the head of a column, pilaster, &c. Till the period of the renaissance, the head of a column in English was called chapiter (chapter), its diminutive being chapitrell. See COLUMN.

CAPITAL, in Fortification, is an imaginary line dividing a defence-work into two similar and equal parts. The C. of a bastion is a right line drawn from the point or salient angle to the middle of the gorge or entrance in the rear. The C. of a ravelin is a right line drawn from the re-entering angle of the counterscarp to the salient angle of the ravelin.

CAPITAL, in Geography, the principal city or town of a country, that in which the sovereign usually resides, and where the legislature meets, and the chief legal courts are held.

CAPITAL, in Trade and Political Economy, is in its restricted sense applied to the money, or the property convertible into money, with which a trader or producer carries on his business. In this sense, Adam Smith and many other writers call it stock; and there is a convenience in having a separate term for expressing this sense of the word C., since it is totally different from its wider sense as an element in political economy. Many attempts have been made to define C. in its general sense, but with very imperfect success, since no sooner is a restrictive definition laid down, than some one can point at things which are C., and yet are not included in the definition. It has, for instance, been called the produce of past labor stored up and applied to the facilitating of future labor; but, as we shall see, many things become C. which the hand of man has never touched. There is no doubt, however, that the existence of C. arises out of the fact of labor or industry having been exercised; and perhaps a good general understanding of its character may be derived from treating it as the *impulse* or *impetus* which past industry gives to facilitate future industry. Wherever something is reserved from immediate consumption, and made to serve in future production, there is capital. We cannot have a better illustration than in the first bow and arrow made by the savage. He has

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expended on this machine for securing his food a portion of the time and labor which he might have given to the tedious task of catching his food with his own hands, and at this sacrifice he has obtained the means of more easily and economically obtaining it in future. All C. is not, however, *directly* made by the industry of the owner, or, indeed, by industry at all. The accidental finder of a diamond, or a pearl, worth £100, possesses so much capital. His acquisition, however, would have no value but for those productions of industry which it is permitted to represent, and if pearls and diamonds were often found, they would cease to be valuable; the trade of finding them is as laborious and as ill remunerated in the long-run as most others. The owner of a barren heath, which was intrinsically worth nothing, finds it become suddenly valuable by the progress of a large town; but it is the industry of that town which has given the value, and the owner having the good-fortune to have a hold on a portion of the produce of that industry, becomes a capitalist. It is impossible to enumerate all the elements of which C. in the general sense consists, or all the ways in which it can be made. Whatever thing done enables some other thing to be done which supplies any of the necessities or wishes of the human race becomes capital. Thus, the education and skill of the barrister, the physician, and the artist—the agility, acquired through long and toilsome practice, of the rope-dancer and the juggler—all are capital. It makes C. to shift the place of a thing, bringing it from where it is not, to where it *is*, wanted. So, also, the changing of a person's place may become C. to him, as where he leaves a district in which his trade is not required, or exceeds the demand, for one where he can pursue it to advantage. Successful emigration thus creates C., bringing into human use districts of land which previously lay useless. The total C. at any time in existence consists of an aggregate of the several capitals at the command of individuals or communities. But it is essential to any unit of C. that it should be sufficient for the purpose it is intended for, otherwise it may seem to be, but will not in reality be, a part of the general aggregate—it will, in fact, be lost. If an expenditure of £1000 be necessary to raise a sunk ship, and only £900 are expended, that sum, which might have been available for some other purpose, is lost. C., as distinguished from property or wealth, is a *moving force;* and if it be not sufficiently strong for accomplishing its purpose, it is lost. This is one of the most important truths in all political economy, since most of the great losses suffered by communities and individuals arise from undertakings for which they have not adequate C., or for which that which seems to be C. does not really turn out to be so. Perhaps the most memorable mistake of this kind ever made was when the French revolutionary government issued assignats (q. v.). These were ostensibly issued on a good security—namely, the security of the forfeited land. But however valuable that land might be in the long-run, it was not available to pay the assignats; there was no purchaser for it; and the assignats consequently fell in value. Gold to a far less amount than the money value of the land—that is to say, than the price which would be paid for it when sold in the natural course of things—would have been a sufficient C. for the issue of these assignats. The same mistake is often exhibited on a small scale when a landed proprietor keeps together a large estate which he cannot afford to improve and cultivate properly. It loses its power of C. in his hands; and he would be much better off if he sold a portion of it for money to be invested in improvements on the remainder. Probably nineteen out of every twenty bankruptcies arise from the bankrupts having undertaken enterprises beyond the reach of their C.—from over-trading, or over-speculating, as it is otherwise called. When speculation becomes epidemic, the whole community suffers from undertakings too great for its C., and a crisis occurs. Such was the great railway crisis of 1847. Parliament had, in the previous year, passed bills for the construction of railways, which, if they had all been made, would have cost upwards of £130,000,000—a sum which the country, rich as it was, could not afford to advance. Though it is an axiom that people cannot trade beyond their C., yet what can be accomplished by any given amount of C. must depend on the skill and sagacity of the person employing it. Competition no doubt tends to equalise profits, but competition is itself a contest in which each tries to drive a more profitable trade than his neighbors, and some are more successful than others. A frequent element of success is the rapid circulation of C., by which it is made to return many profits, though perhaps small ones, in the course of the year. The trader who turns over his C. ten times at a profit of 3 per cent., makes more than he who draws a single profit of 10.

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If the nature of C., as the produce of past, and the promoter of future industry, were better understood by the working-classes, they would be saved from much unhappiness and mischief. Whatever C. may be to the rich man, it is bread itself to the working family. The withdrawal of the C. embarked in the cotton trade alone would starve millions; and yet many educated men have endeavored to teach working-people that C. is their natural enemy. Its strength may no doubt be sometimes used for evil purposes, but none save evil results can arise from destroying it. The only way in which any man can effectually protect himself from such mischief as he supposes it may do, is to save, and become a participator in it. Itself the result of industry, it is a more powerful instrument in the hands of him who has made it than in any other's. The savings of working-men are the best laid out C. in the world. The first pound laid past is the most profitable of all—it represents freedom from debt, and the capacity of its owner to purchase what he wants with ready money—a privilege probably bringing him a profit of many pounds, or many hundreds per cent. upon his capital.

CAPITAL ACCOUNT; such is the name given to what concerns the capital stock of a railway or other public company. In authorising a railway company—which we take as an example—parliament gives power to raise so much money by shares, and so much by borrowing. The amount that may be borrowed is equal to a third of the share stock, but it cannot be legally borrowed until at least one-half of the share stock has been paid up. The form of borrowing is that of giving a mortgage on the whole property of the railway; the deed of mortgage, which is called a debenture, expresses the sum lent, the rate of interest that is to be paid, and the period for which the loan is given. See DEBENTURE. Unitedly, the money got for shares and by debentures forms the the capital of the company; and, deposited in a bank constitutes the *Capital-Account*. On this fund the directors of the company make draughts to pay for the land, and all the works connected with the line, as also rails, locomotives, carriages, and, in short, everything involved in perfecting the railway up to the point of working. From the first, the holders of debentures receive interest, which must be paid in all circumstances, and the principal must be returned at the conclusion of the period for which it has been borrowed; at least, such are the ordinary obligations toward debenture holders. For the share part of the capital no return is made till the railway has been in operation, and drawings come in from the traffic.

As soon as traffic commences, there begins a new account called the *Revenue Account*, and which, kept in the same or a different bank, has no connection with the Capital Account. This, it may be judged, at once introduces a great complexity into the financial affairs of railways. In ordinary businesses, the profits of a concern are the free proceeds after deducting interest on capital and all expenses; and no attempt is made to keep two accounts, or to detach one part of the revenue from the other. As shareholders in a railway occupy the position of partners in a business, it might be expected that they would receive a divisible part of the proceeds equal to their respective claims after all expenses whatsoever had been paid. This is not the plan usually adopted. In general, the shareholders are only temporary partners; they buy shares in order to sell them at an advance. What they mainly look to is the rise on shares in the market, and therefore any process of management which can promote this important object meets their approval. Hence, the keeping of two accounts, two bank pass-books, and two books of cheques. From the revenue account are drawn all payments for wages, rates, and taxes, coke, oil, and other petty furnishings, also repairs on carriages and locomotives, maintenance of way, and general management. What remains is the fund, whence is paid, first, the interest on debentures, and, second, the dividend of the shareholders. From the C. A. are drawn all other outlays: first, the repayment of principal to debenture holders, and, second, the expenditure for new carriages and locomotives, new rails, and other substantial repairs upon and additions to the plant. As all railway traffic exceeds the expectations formed respecting it, the demands on the C. A. for fresh additions of one kind or other, become exceedingly onerous. Were the shareholders to look to ultimate advantages, they would sanction the payment for permanent improvements out of the current revenue; but, as has been stated, shareholders for the most part care nothing for the remote and contingent prosperity of the undertaking, and will not, or cannot make a con-

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responding sacrifice. Greatly diminished by primary outlay, and now operated upon for all sorts of additions and improvements, the C. A. is at length exhausted, and new powers have to be got from parliament to create new shares and new debentures, and which shares are only taken up by being guaranteed a preferable claim on the funds of the company. Where a large extension of traffic must be provided for, the creation of fresh capital is indispensable and legitimate; but it is equally open to remark that the C. A., as usually conducted, affords the means of enormously increasing the company's obligations, and is, in fact, an expedient to give good dividends to present holders of stock at the cost of their successors. Perceiving what must be the consequences, those among the proprietary of the small and more prudently managed railways who look to permanent investment, lose no oppprtunity to urge "that the capital account shall be closed, and the whole expenditure of the company, including the payment of dividends and interests, to be taken from revenue." Objections are raised to these remonstrances, sometimes on plausible, sometimes on sufficiently valid, grounds; and it may be said that in remarkably few cases have railway companies been able, or been disposed, to close their Capital Account. See RAILWAYS (Legislation and Management). W. C.

CAPITAL FELONIES. See FELON.

CAPITAL PUNISHMENT in criminal jurisprudence is the punishment of death. It is called *capital* punishment because the head (Lat. *caput*), from being the most vital, is usually that part of the body which is acted on. This applies especially to to beheading and hanging; but almost all modes of depriving a criminal of life appear to have in view the peculiar vulnerability, and, at the same time, vitality of the head. This extreme penalty, notwithstanding the practice of the world from the remotest times down to the present day, has frequently been reprobated by philosophers and philanthropists, who have even gone so far as to deny the right so to punish to any earthly power. The weight of authority, however, appears in favor of capital punishment. Mr Bentham, one of the most reasonable and discriminating authorities on the subject, in his well-known and valuable treatise, says, that the idea of C. P. would naturally suggest itself in the infancy of a state. When any one had committed an offence, and disturbed the peace of society, the question would then first arise: "How shall we prevent these things?" and the answer most likely to occur to a set of barbarians would be: "Extirpate the offender, and give yourself no further trouble about him." And in conformity with this view of the matter, he alludes in a note to the case of the Hottentots, who have no fixed laws to direct them in the distribution of justice, and consequently, when an offence has been committed, there is no form of trial, or proportion of punishments to offences; but the kraal (village) is called together, the delinquent is placed in the midst, and without further ceremony, demolished with their clubs, the chief striking the first blow. The Marquis Beccaria, in his remarkable "Essay on Crimes and Punishments," strongly argues against the capital sentence being carried out in any case, denying the right, in fact, of government so to punish, and maintaining, besides, that it is a less efficacious method of deterring others, than the continued example of a living culprit condemned, by laboring as a slave, to repair the injury he has done to society. Bentham, on the contrary, holds that death is regarded by most men as the greatest of all evils; and that especially among those who are attached to life by the ties of reputation, affection, enjoyment, hope, or fear, it appears to be a more efficacious punishment than any other. On the question of right, Beccaria is still more pointedly refuted by Sir Samuel Romilly, who observed: "Beccaria and his disciples confess that it is not the greatest of evils, and recommend other punishments as being more severe and effectual, forgetting, undoubtedly, that if human tribunals have a right to inflict a severer punishment than death, they must have a right to inflict death itself" ("Memoirs," vol. iii. p. 378). It is not a little interesting to know, that such was the opinion of one who did so much as a statesman to mitigate the severity of the criminal law.

Against C. P. arguments are often urged from Scripture, based on the general principle of Christian charity. To these it is replied that they proceed on a misapprehension and a misapplication of the principle; and reference is confidently made to the Old Testament as sufficiently exhibiting the mind of the great Lawgiver in regard to this matter.

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Death was, in former times in England, the ordinary punishment for all felonies, and the certain doom of those who could not avail themselves of *benefit of clergy* (q. v.), i. e., the common law inflicted death on every felon *who could not read*, and the law implied that punishment, where a statute made any new offence felony. On the other hand, the numerous acts of parliament creating felonies without benefit of clergy, shew that the statute law was still more sanguinary, so that of the 160 offences referred to by Blackstone as punishable with death four-fifths had been made so during the reigns of the first three Georges. That some idea may be formed of such Draconian justice as was then established, we may mention the following as among the offences which involved sentence of death—stealing in a dwelling-house to the amount of 40*s.*; stealing privately in a shop goods of the value of 5*s.*; counterfeiting the stamps that were used for the sale of *perfumery!* and doing the same with the stamps used for the certificates for *hair-powder!* Thanks, however, to the exertions of Sir Samuel Romilly, the inhumanity and impolicy of such a state of the criminal code gave way, towards the end of the reign of George III., to a course of legislation which has reduced the application of death as a punishment within its present humane limits. Practically, indeed, it is only in the case of treason and murder that the capital sentence is ever pronounced; and even then, it is not always carried out, for the crown reserves to itself and exercises a right of review which frequently leads to such a change in the convict's fate as at least spares his life. This discretionary control on the part of the executive is essential in the present state of the law, which affords no means for a judicial appeal on the merits; for the very nature of the punishment, when finally executed, precludes the idea of all benefit to the sufferer, should the verdict of the jury afterwards turn out erroneous, and the innocence, instead of the guilt, of the accused be established. The law as it stands, indeed, allows a capital sentence to be reversed if technical error can be shewn on the face of the judgment or other matter of record—but what avails that, after the sentence has been executed?

In Scotland, the administration of the criminal law has perhaps been, on the whole, as severe as in England. Mr Erskine says, that "those crimes that are in their consequences *most hurtful to society*, are punished capitally or by death," a category that is certainly sufficiently indefinite; and anciently, it might be shewn that the executions in Scotland for offences corresponding to those which were capitally punished in England, were in proportion to the population, quite as numerous as those in the latter country. But in the more modern practice of Scotland, capital sentence was only pronounced in the four pleas of the crown—viz., murder, rape, robbery, and wilful fire-raising, to which may be added housebreaking. At present the penal system in Scotland may be said to be identical with that in England, death, as a punishment, being only inflicted in the case of convictions for murder.

With respect to the mode of executing C. P., we need not detain the reader by any account of the obsolete cruelties and tortures of former times. It may suffice to state that *hanging* and *beheading* are the two methods which now, for the most part, are practised in the different European states, indeed, with the exception of Spain, by all. In the last country, the death of the culprit is instantaneously caused by the *Garrotte* (q. v.). In England, Scotland, and Ireland, and in all the dependencies of the crown, the convict is hanged; while in France he is decapitated by the *Guillotine* (q. v.), an instrument which an old Scotch machine called the *Maiden* (q. v.), and used for the same purpose, very much resembled. In most of the German states, beheading is the mode of execution adopted; but in Austria, criminals convicted of capital offences are hanged, as in England. See Execution.

The following works may be consulted on the subject of this article: Basil Montagu "On the Punishment of Death," 3 vols. (1809, 1812, 1813), in which he collects the opinions of different eminent authorities; "Memoirs of Sir Samuel Romilly," 3 vols. (1840), and his miscellaneous law-pamphlets; Jeremy Bentham's "Rationale of Punishment" (1830); Beccaria's "Essay on Crimes and Punishments" (1775); Edward Gibbon Wakefield's "Facts Relating to the Punishment of Death in the Metropolis" (1831); and Frederic Hill's "Crime, its Amount, Causes, and Remedies" (1853).

Capital Punishments in the Army and Navy.—1. *In the army.*—The law on this subject is contained in the 19th of the Articles of War now in force, which prescribes death as the punishment of the following offences, or such other punish-

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ment as by a court-martial shall be awarded. (1.) Any officer or soldier who shall excite or join in any mutiny or sedition in any forces belonging to her Majesty's army, or Royal Marines, or who shall not use his utmost endeavors to suppress it, and knowing of it, shall not give immediate information of it to his commanding officer; or (2) who shall hold correspondence with, or give advice or intelligence to, any rebel or enemy of her Majesty; or (3) who shall treat with any rebel or enemy without her Majesty's license, or license of the chief commander; or (4) shall misbehave himself before the enemy; or (5) shall shamefully abandon or deliver up any garrison, fortress, post or guard committed to his charge; or (6) shall compel the governor or commanding officer to deliver up or abandon such place; or (7) shall induce others to misbehave before the enemy, or abandon or deliver up their posts; or (8) shall desert her Majesty's service; or (9) shall leave his post before being regularly relieved, or shall sleep on his post; or (10) shall strike or offer any violence to his superior officer, being in the execution of his office, or shall disobey any lawful command of his superior officer; or (11) who, being confined in a military prison, shall offer any violence against any visitor or other his superior military officer, being in the execution of his office.

By article 20, it is declare that no judgment of death by a court-martial shall pass, unless two-thirds at least of the officers present shall concur therein; and by article 21, it is provided that judgment of death may be commuted for penal servitude for any term not less than four years, or for imprisonment for such term as shall seem meet.

It would appear that the employment of a soldier in the service subsequent to his arrest on a capital charge, may operate as a remission of the sentence of death. This is illustrated by the following case, mentioned by Mr Pendergast in his "Law Relating to Officers of the Army" (2d. ed., 1855, p. 245): In 1811, private John Weblin of the 3d Buffs was sentenced to be shot. The commander-in-chief, the Duke of Wellington, in his "Remarks" upon the proceedings, took no ice that, through some extraordinary inattention, the prisoner had actually been permitted to serve in an engagement with the enemy, after he had been put into arrest for his crime. On this ground, the duke pronounced that he was under the *necessity* of *pardoning* the prisoner.

In the army, C. P. is inflicted by the offender being either shot or hanged—the latter being the more disgraceful mode of execution.

2. *In the navy.*—These are regulated by the 22 Geo. II. c. 33, amended by the 10 and 11 Vict. c. 59. By the first of these acts, certain offences in the navy, whether on board ship or on shore, were punished with death absolutely, without any discretion in the court to alter or mitigate the sentence. But, by the 10 and 11 Vict., this severity is removed (excepting in the cases of murder and other unnatural offences mentioned in the act), and courts-marshal are authorised to abstain from pronouncing judgment of death, if they shall think fit, and to impose such other punishment instead as the nature and degree of the offence may deserve. In this discretionary sense, the following offences are punishable, in the navy, with death: (1) The holding illegal correspondence with an enemy; (2) the not acquainting, within 12 hours after the opportunity to do so, the commander-in-chief, or other superior officer of the squadron, with any message from an enemy or rebel; (3) all spies bringing seducing letters from an enemy or rebel, or endeavoring to corrupt any one in the fleet to betray his trust; (4) the relieving an enemy or rebel in any way, directly or indirectly; (5) not preparing for fight when duty commands, or not making due preparations on likelihood of engagement, and not encouraging the inferior officers and men to fight courageously; (6) the treacherously or cowardly yielding or crying for quarter; (7) disobeying orders in time of action, or not using all possible endeavors to put the same effectually in execution; (8) being guilty of cowardice or neglect of duty in time of action; (9) through cowardice, negligence, or disaffection, forbearing to pursue the chase of any enemy, pirate, or rebel, beaten or flying, or not relieving or assisting a known friend in view to the utmost; (10) deserting to the enemy, or running away with any of her Majesty's ships or their belongings, or any pieces to the weakening of the service, or cowardly or treacherously yielding up the same; (11) deserting simply, or enticing others to do so; (12) making, or endeavoring to make, any mutinous assembly on any pretence whatsoever; (13) uttering words of sedition or mutiny; (14) concealing traitorous or mutinous practices or

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designs; (15) striking a superior officer, or offering any violence to him, being in execution of his office, on any pretence whatsoever; (16) unlawfully burning or setting fire to any ship property or furniture, not then appertaining to an enemy, pirate, or rebel; (17) neglect in steering any of her Majesty's ships, so that the same be stranded, split, or hazarded; (18) sleeping on watch, or negligently performing duty, or forsaking station; and (19) robbery.

It is stated by Mr Prendergast, in the work to which we have referred (p. 244), that a sentence of death pronounced by a court-martial does not operate as an absolute dismissal from the service; for if the offender should be pardoned, he is restored to his former position.

But though a pardon operates as a restoration to the service, the greater question still remains to be judicially decided, whether a restoration to the service operates as a pardon. This question is inseparably connected with the fate of the gallant but unfortunate Sir Walter Raleigh. He had been condemned to death for alleged participation in a treasonable plot to raise Arabella Stuart to the throne; and, after undergoing 13 years' imprisonment, he received from James I., by a commission under the Great Seal, the command of a fleet and army fitted out against the Spanish possessions in South America, with power of life and death over the king's subjects serving in the expedition. The enterprise failed; and on Sir Walter's return to England, James caused his head to be struck off, according to the sentence originally pronounced. On shewing cause against his execution, Sir Walter pleaded that his commission was tantamount to a pardon, and quoted a case of a man who had been condemned for felony, having been pardoned on account of his subsequent service in the wars of Gascony. Lord Chief-Justice Montagu, however, held that though an implied pardon of the kind cited might hold good in felony, that treason could only be pardoned by express words. There is the high legal authority of the late Lord Chancellor Campbell* for saying that the chief-justice declared and expounded the law soundly; and that in strictness Sir Walter's attainder, under the former judgment, could only be done away with by letters-patent under the Great Seal, expressly reciting the treason, and granting a free pardon. See, on the subject of these two articles, ARTICLES OF WAR, and MUTINY ACT.

As to the mode of C. P. in the navy, the culprit, where he is an officer, is shot; where he is a common seaman, he is usually hanged at the yard-arm.

CAPITALS (*majuscula*), in contradistinction to small letters (*minuscula*), are the large letters employed in writing and printing to help the eye, to relieve the uniformity of the pages, to increase the facility of keeping and finding the place, to mark the beginnings of sentences, proper names, &c. Among the ancients, and during the earlier part of the middle ages, no distinction of C. and small letters was known; and after the practice had been introduced of beginning books and chapters with great letters, often adorned or illustrated with much artistic ability, it was long before C. were employed in such a way as could afford much real advantage to the reader. At the present day, they are universally employed, even in the printing of Greek and Latin books. Considerable diversity has existed at different times with regard to the employment of them, the books of the 17th and 18th c. exhibiting a much greater proportion of them than those of the present day. In German books, all substantives usually begin with a capital letter; in English and French books of the present day, they in general appear only at the beginnings of sentences and of proper names. Adjectives formed from proper names, as *English*, *French*, &c., are generally begun with a capital in English books, but not in French nor in German ones.

CAPITANA'TA, or Foggia, a province of Italy, the *Daunia* of the ancients, is bounded n. and e. by the Adriatic, and on the s.w. by the Apennines. It stretches along the Adriatic about 70 miles in a straight line, and its average breadth is about 45 miles; but its coast-line, measuring round the great promontory of Monte Gargano, which has been called "the spur of Italy," is fully 100 miles. and its breadth between the extremity of that projection and the Apennines, 75 miles. Pop. (1871) 319,164. The greater part of the surface is a sandy plain sloping from the Apennines to the Adriatic, and watered only by some inconsiderable streams. The rearing and

* "Lives of the Chief-Justices," vol. i. pp. 357, 359.

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feeding of cattle form the chief occupations of the inhabitants. Wheat, wine, and fruits of various kinds are produced in quantities sufficient to admit of exportation. There are important salt-works, quarries of alabaster, and potters'-clay. Foggia is the chief town.

CAPITATION, from the Latin *caput*, a head, means something applicable to all persons, or to the people, by the head. A tax levied on all persons, without reference to property or other incidents, is called a C. tax, and sometimes a poll tax. The former term was often used in France for the tax better known as the *taille*, although this offensive impost was not imposed on all alike, the nobility enjoying many exemptions from it.

CAPITOL, the fortress of ancient Rome, and site of the national sanctuary the temple of Jupiter, was situated on the *Mons Capitolinus*, the smallest but most famous of the seven hills on which Rome was built. The hill itself was first termed *Mons Saturninus*, afterwards *Mons Tarpeius* and *Rupes Tarpeia*, and after the foundation of the Capitol, *Mons Capitolinus*, though a particular portion of it retained its ancient name of *Rupes Tarpeia*. It was steep and abrupt in almost every part, formed a natural fortress, and was strengthened here and there by towers. The C. was founded by Tarquinius Priscus, and completed by Tarquinius Superbus, who tasked the people to work at it. The whole mount had a circumference of about 800 paces. During the civil wars under Sulla, the temple was burned (according to Tacitus, by design), and after its restoration, destroyed during the Vitellian riots. It was rebuilt by Vespasian, after whose death it was again destroyed by fire, but was once more restored by Domitian, who instituted here the Capitoline Games. Domitian's structure lasted to a late period of the empire. Regarding the site of the C., there has been great dispute; the German scholars, for the most part, maintaining that it occupied the south-west summit of the hill, and the Italians, the north-east. The latter situation has the weight of probabilities in its favor. From that portion of the mount named the Tarpeian Rock, state criminals were thrown down. According to the description given by Dionysius of Halicarnassus, the temple of Jupiter, with its peristyle of columns, was 200 feet long by 185 feet wide, and was divided into three cellæ, separated from each other by walls, and respectively dedicated to Jupiter, Juno, and Minerva. In the spacious portico, the people feasted on triumphal occasions. The scanty ruins remaining in the present day consist of a substructure of peperino or volcanic tufa, a wall of the same materials, and some remains of the south front, together with a portion of the great flight of steps leading to the temple.

The modern C. (*Campidoglio*), built on the site, and partly on the foundation of the ancient C., was designed by Michael Angelo, but is one of his inferior works. The main entrance, however, presents a splendid view. It is used as a kind of hotel-de-ville and museum.

Besides the great temple of Jupiter, the most important structures on the Capitoline Mount were the temple of Jupiter Tonans, built by the Emperor Augustus; and the magnificent *Tabularium*, containing archives, and, in connection with the Ærarium ("Treasury"), serving as a library and place for lectures, &c. The remains of this structure, built by Quintus Catulus, 78 B. C., have still an imposing aspect.

CAPITULARIES (Lat. *capitularia*). *Capitularium* is literally a book divided into chapters: and the plural of the word was the name given to the laws issued by the kings of the first and second of the Frankish races, from Charles Martel downwards. These laws proceeded from the great assemblies of the king, nobles, and bishops, which formed the states of the kingdom, and, from their general character, were opposed to the laws issued for the separate states, which were called *leges*. They were divided into general and special C., according to the more or less general nature of the interests which they embraced, and the mode of their publication. They have by no means been all preserved. The most famous are those of Charlemagne and of St Louis. In 827, Abbot Angesius, of Fontenelles, made a collection of the C. of Charlemagne, and of his son, Louis le Débonnaire. Other collections were made by private persons, and, in 847, one by authority of the king, but they are all very imperfect and ill arranged. After Charles the Simple, in 922, no more C. were

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issued, and no similar laws or statutes exist from that period till the time of Louis le Gros, in 1100. The best collections are those of Baluze (Paris, 1677 and 1780), and of Pertz, in the "Monumenta Germaniæ."

CAPITULA'TION, a treaty consisting of several specified conditions (Lat. *capitula*, heads). In the military sense of the word, a C. is a treaty of surrender to an enemy. When a place can no longer be defended, on account of failure of ammunition or provisions, or the progress made by the besieging-party, a white flag is commonly put up, as a sign that the besieged are willing to capitulate. According to the kind and degree of peril in which the fortress is placed, so are the terms which the governor may reasonably expect from his successful opponent. Sometimes the arms and military stores are left to the besieged, but more frequently they are taken by the besiegers, except articles of private property belonging to the officers and men. The "honors of war," the marching out with drums beating and colors flying, are usually stipulated for, unless the conqueror exacts very severe terms. The mildest form of a C. is a *convention*, agreed to when the conqueror is not strong enough to insist on stringent conditions.

CAPI'Z, a town on the island of Panay, in the Philippine Archipelago. It is situated on a plain on the north coast, near the rivers Panay, Panitan, and Ivisan, by which it is sometimes inundated during the rainy season. It is defended by a small fort, and is the residence of a Spanish alcalde. Pop. 11,000.

CA'PNOMANCY, a word formed from the Greek *capnos*, smoke, and *manteia*, divination. The ancients practised it in two different ways—either they threw grains of jasmine or poppy on the burning coals, and watched the motions and the density of the smoke that rose from them, or they watched the smoke of sacrifices. This latter kind of C. was most generally employed, and that to which the greatest importance was attached. If the smoke was thin, and ascended in a right line, instead of being blown back by the breeze, or spreading over the altar, the augury was good. It was also believed that the inhalation of the smoke rising from the victims or from the fire which consumed them, gifted the priests with prophetic inspiration.

CA'PO D'I'STRIA, a fortified seaport town of Austria, situated on a rocky island in the Gulf of Trieste, 8 miles south-west of the city of Trieste. It is capital of the circle of Istria, with the peninsula of which it is connected by a stone causeway, nearly half a mile long. Its old buildings, ruinous walls, and narrow streets, give the town a gloomy aspect. It has a cathedral, manufactures of leather and soap, and a trade in wine, oil, and salt. Pop. (1869) 7589. In ancient times, this place was known as *Ægida*, and afterwards as *Justinopolis*, in honor of Justin II., who restored it.

CAPO D'ISTRIA, or Capo D'Istrias, John Anthony, Count, president of the Greek republic from 1827 to 1831, was born in Corfu, 1780. His family had been settled in that island since the 14th c., but originally came from the Illyrian town of Capo d'Istria (q. v.) near Trieste. He devoted himself to political life, and after having held a high position in the Ionian Islands, he entered the diplomatic service of Russia. Here his diplomacy tended to the separation of Greece from Turkey. In 1827 he was elected president of Greece; and in January 1828, he landed in Greece, and entered upon the duties of his office. He was a patriot, a philanthropist, and an able diplomatist, but by no means equal to the task which he now undertook. Everything was in disorder; the people had been long enslaved, and knew not how to use their freedom; and the president had been so much imbued with the centralising principles prevalent at the courts which he had frequented, that some of his measures, especially that restricting the liberty of the press, gave offence to the most temperate of the enlightened lovers of civil liberty. His career was cut short by his assassination in a church at Nauplia on October 9, 1831. The assassins were relatives of Peter Mauromichali, against whom he was urging on a prosecution, for alleged offences against the state.

CAPONIE'RE, or Caponnière, in Fortification, is a parapet 8 or 10 feet high, with a superior slope, terminating in a small glacis. It is placed in the ditch of a fortified place, to cover or screen the defenders while passing from one defence-work to another. Generally, it has a banquette, on which musketeers may stand to fire

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over the crest. If there is a passage between two such parapets, it is a *full* caponnière; if on one side only, a *half* caponière. Generally the parapets are of earth, and the passage open overhead; but sometimes caponnières are vaulted galleries of brickwork, loopholed at the sides for musketry; while in field-works, palisade caponnières are occasionally thrown across the ditches of redoubts.

CAPPADO'CIA. anciently, a province, and subsequently a kingdom in the west of Asia (in part the present Caramania). It was bounded by Lycaonia on the w., by Cilicia and Syria on the s., by Armenia on the e., and by Pontus on the n. During the time that it belonged to the Persian empire, however, it included Pontus, which was called Lesser Cappadocia. In 17 A. D., C. was erected into a separate province of the Roman empire, by Tiberius.

CA'PPAGH BROWN, a bituminous earth, which yields pigments of various shades of brown, the two most strongly marked being known as Light and Dark Cappagh Brown. The coloring matters are oxide of manganese and iron. The C. Browns are transparent and permanent; and when not applied too thickly, they dry well in oil. The name is derived from Cappagh, near Cork, in Ireland. C. B. is also called Encrome Mineral, and more frequently, Manganese Brown.

CAPPARI'DEÆ, or Capparida'ceæ, a natural order of exogenous plants, allied to *Cruciferæ*, and including about 350 known species, herbaceous plants, shrubs, and trees, mostly natives of tropical and sub-tropical countries. The leaves are generally alternate, stalked, undivided, or palmate; the flowers solitary or clustered; the calyx of four sepals, sometimes cohering in a tube; the corolla of four, or sometimes eight petals, sometimes wanting, the stamens generally a multiple of four, or indefinitely numerous, placed on a hemispherical or elongated disk; the ovary one-celled, the style thread-like or wanting; the ovules curved; the fruit either dry and pod-like (tribe *Cleomeæ*), or a berry (tribe *Capparcæ*).—To this order belongs the well-known caper-bush. See CAPERS. Many of the species possess stimulant properties; some are poisonous. One of the most interesting plants of the order is the Sîwâk (*Capparis sodata*), a bush or small tree, one of the most characteristic features of the vegetation of Africa, from the Great Desert to the Niger, the small berries of which have a pungent taste like pepper, and when dried, constitute an important ingredient in the food of the inhabitants of those regions; whilst the roots when burned yield no small quantity of salt.—"Barth's Travels."

CAPPEL, a village of Switzerland, in the canton of Zurich, and 10 miles s. s. w. of the city of that name. It is interesting as the place where the great reformer Zwinglius was killed in a conflict with troops of the Roman Catholic cantons, October 1531. A monument has been erected here to his memory.

CAPRE'RA, or Cabrera, one of a group of small islands called the Buccinari Islands, in the Strait of Bonifacio, to the east of the north point of Sardinia (q. v.). They belong to the Italian province of Sassari. C. is separated from the coast of Sardinia by a strait of little more than a mile in breadth, and by a similar narrow strait from the island of Maddalena, which lies to the west. Its greatest length, from north to south, is about six miles, and its breadth is from two to three miles. Like Maddalena and the rest of the Buccinari Isles, and the neighboring coast of Sardinia, C. is rocky, bare, and unfertile. It has no streams, and is in few places adapted either for the pasture of cattle or for the plough. In former times, it was the abode only of wild goats—whence its name (Lat. and Ital. *capra*, a goat)—and rabbits, and was occasionally visited by goat-herds and fishermen. It has of late years acquired celebrity as the ordinary residence of Garibaldi, who acquired a property and built a house here in 1854. He dwelt here from 1854 to 1858, and again made it his abode in the autumn of 1860. It was to C. that he was sent in September 1867, in honorable banishment by the Italian government, after having been taken prisoner at Asinalunga, in consequence of his design of entering the Roman territory to promote an insurrection and overthrow the papal government, and in C. he still resides.

CA'PRI (the ancient *Capreæ*), a charming island in the Mediterranean, at the entrance of the Bay of Naples, about three miles from Cape Campanella, and twenty miles south of the city of Naples. On its small area of about eleven miles in circumference, it displays a rich variety of beautiful scenery, ruins of antiquity,

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and points of historical interest, and contains a population of about 6000 souls. The island is composed of two mountain masses, seperated from each other by a depression like the seat of a saddle. That on the west, called Monte Solaro, which is the highest and largest, has an elevation of about 1900 feet. The eastern part does not attain a height of more than 860 feet above the sea. At the base of the eastern mountain is situated the town of C. built on a shelving rock and guarded by walls, gates, and draw-bridges, with a cathedral, and a population, including the district, of about 4000. It commands a beautiful prospect, and communicates with the little town of Anacapri, on the western table-land, by a flight of 535 rude steps, cut in the face of the rock. There are only two safe landing-places on the island, and these are at C. and near it. C. was a celebrated place, in the times of Augustus and Tiberius. Ruins are still found of Roman baths and aqueducts, and of the twelve grand villas or palaces built in honor of the twelve chief deities by the Emperor Tiberius, who passed the last ten years of his life here in the practice of the grossest licentiousness and cruelty. The inhabitants now consist of fishermen, sailors, and a few traders, with vine-dressers and cultivators of olives in Anacapri. Wherever a tree can be planted, the hopeful and industrious people have prepared for it a soil by persevering toil in terrace-culture. Delicious quails, which in vast numbers alight on the island during their migrations to and from Africa, in spring and autumn, are taken in nets, and form an important item in the resources of Capri. To the west of the town of C. is situated the *Grotto Azzurra* (Blue Grotto), a remarkable cavern, entered from the sea by a narrow opening not more than three feet high. Inside, however, it is found to be of magnificent proportions, and of marvellous beauty, the gorgeous coloring being said to be produced by the reflection and refraction of the sun's rays through the water. Elliptical in form, it has a length of 165 feet, a breadth of 100 in the widest part, and a height of 40 in the loftiest, with 48 feet of water beneath.

CAPRI'CCIO (Ital.), in Art, is applied to a picture or other work which designedly violates the ordinary rules of composition. Foliated ornaments, with Cupids or other figures appearing in them in situations not strictly natural, are capriccios.

CAPRICCIO, in Music, is a species of free composition, without being subject to rule as to form or figure. Locatelli, at the beginning of the 18th c., composed capriccios for the violin. The most celebrated C. of modern times is Mendelssohn's B. minor C. for pianoforte and orchestra.

CAPRICO'RNUS, the *Goat*, a southern constellation, and the tenth sign of the zodiac (q. v.); denoted by a sign representing the crooked horn of a goat. It is usually represented on the globe as having the fore-part of a goat, but the hinder part of a fish. It is one of the least striking of the zodiacal constellations. It was, however, celebrated among the ancients, who regarded it as the harbinger of good-fortune, and as marking the southern tropic or winter solstice, wherefore they called it the "Southern Gate of the Sun." It contains no large stars, the two largest, which are situated in the horns, being only of the third magnitude. Neither of these rises above the horizon in our latitude. See TROPICS.

CA'PRIDÆ, a family of ruminant quadrupeds, which, as defined by some naturalists, may be described as the *Sheep and Goat* family, including the Linnæan genera *Ovis* (Sheep, q. v.) and *Capra* (Goat, q. v); but which is extended by others to include Antelopes, their persistent horns being regarded as the great distinction between them and the *Cervidæ* or Deer family. In the more restricted sense, the name designates a very natural family, yet differing from the *Bovidæ*, or Ox family more in general appearance than in other characters; whilst links of connection with the Antelopes are not wanting, a very remarkable one being found in the Prong-horn of America.

CAPRIFICA'TION, a method which has long been employed in the Levant for securing and hastening the maturation of figs, and which consists in suspending fruit-bearing branches of the wild fig above or beside those of the cultivated tree. The notion once entertained, that this practice is analogous to that by which the fecundation of the female palm-tree is secured, is inconsistent with the now well-known fact, that the fig has both male and female flowers within its own recep cle;

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and it is therefore supposed that the effects of C. may result from the agency of a species of insect, of which the eggs have been deposited in the early wild figs, and which may promote fecundation by entering the receptacle of the cultivated fig, or perhaps by puncturing it may cause it to ripen sooner. In hope of a similar advantage, some French and English cultivators have inserted into figs straws dipped in olive-oil. But C. is scarcely practised in the western parts of Europe, and has even been discontinued as unnecessary in some parts of the east where it once prevailed.

CAPRIFOLIA'CEÆ, a natural order of exogenous plants, consisting of shrubs and herbaceous plants, which have opposite leaves without stipules, and flowers disposed in corymbs, in heads, or in whorls. The calyx is 4—5-cleft; the corolla monopetalous, tubular, or wheel-shaped, sometimes irregular. The stamens are adherent to the corolla at its base, and alternate with its lobes. The ovary is free, 1—5-celled. The fruit is generally a berry, sometimes dry, but not splitting open when ripe. The order is very nearly related to *Cinchonaceæ*, differing chiefly in the want of stipules. More than 200 species are known, chiefly natives of the temperate and colder parts of the northern hemisphere. To this order belong the Honeysuckle, Elder, Viburnum, and Snowberry. Emetic and cathartic properties are prevalent in it.

CAPRIMU'LGIDÆ, a family of birds, of the order *Insessores*, and tribe *Fissirostres*, nearly allied to the *Hirundinidæ* or Swallow tribe, but differing from them in the still greater width of gape, and in having long stiff bristles at the base of the bill. They are insectivorous birds. They have very long wings, short legs, and toes united at the base by a membrane. The European goatsucker may be said to be the type of the family, which includes also the Whip-poor-will and Night-hawk of America, with many other species widely distributed over the globe, and now arranged by naturalists in a number of genera.

CAPRO'IC, Capry'lic, and Capric Acids are represented by the formulæ $C_{12}H_{12}O_4$, $C_{16}H_{16}O_4$, and $C_{20}H_{20}O_4$, and are members of the acetic or fatty-acid series. They derive their names from *capra*, a goat, in consequence of their more or less resembling in smell the odor of that animal. They may all be obtained from butter by pressing out the portion which remains liquid at 60°, saponifying this oil, and distilling the soap which is thus formed with sulphuric acid. The liquid which passes over contains these three acids, together with butyric acid, which, by being converted into baryta salts, are separable from one another. All three of these acids are also obtained by the oxidation of oleic acid by nitric acid; and capric acid is also obtained by acting upon oil of rue with fuming nitric acid; hence it is frequently called *rutic acid*.

CAPSA'LI, a seaport town of the Ionian Islands, capital of Cerigo, or Cythera, is built upon a narrow ridge, terminating in a precipitous rock near the south end of the island. It has an old castle and a good harbor. Pop. 5000.

CA'PSICINE, an alkaloid, is the active principle in capsicum or Cayenne pepper, and can be obtained from it. It is a thick liquid, of a reddish color, and possessing such acrid properties, that half a grain diffused through a large room causes every one therein to sneeze violently.

CA'PSICUM, a genus of plants of the natural order *Solanaceæ*, having a wheel-shaped corolla, projecting and converging stamens, and a dry berry. The species are all of a shrubby, bushy appearance, and have more or less woody stems, although they are annual or biennial plants. The number of species is very uncertain, some botanists distinguishing many, whilst others regard them as mere varieties of a few. They are natives of the warm parts of America and of Asia, have simple leaves, and rather inconspicuous flowers, and some of them are in very general cultivation in tropical and sub-tropical countries for their fruit, which is extremely pungent and stimulant, and is employed in sauces, mixed pickles, &c., often under its Mexican name of *Chillies*; and when dried and ground, forms the spice called *Cayenne Pepper*. As a condiment, it improves the flavor of food, aids digestion, and prevents flatulence. In tropical countries, it counteracts the enervating influence of external heat. In medicine, it is used as a stimulant, rubefacient, and vesicant; is often administered in combination with cinchona; and is particularly valuable both internally administered and as a gargle, not only in relaxed con-

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ditions of the throat, but in some of those diseases in which the throat is most dangerously affected. As a medicine, C. is administered in *pills* mixed with bread: in the form of *tincture*, obtained by digesting the bruised C. in alcohol; or of an *infusion*, procured by digestion in water, with varying proportions of salt and vinegar. A gargle of C. is prepared by infusing it in water, along with candy-sugar and vinegar, and thereafter adding a little infusion of roses. It has no narcotic properties. It owes its power chiefly to *Capsicine* (q. v.). The fruits of the different species of C. differ in form, being round, oval, conical, heart-shaped, &c.; they vary from half an inch to four inches in length, and are sometimes of a bright red, sometimes of a yellow color. In all, the dry berry has an inflated appearance, and contains numerous whitish flattened seeds, which are even more pungent than the leathery epidermis, or the spungy pulp. Cayenne pepper consists chiefly of the ground seeds. *C. annuum*, sometimes called Common C., or Chilly Pepper, is perhaps the most common species in cultivation; and in the southern parts of Britain, if raised on a hotbed as a tender annual, it produces fruit in the open border. There are several varieties of it. *C. frutescens*, sometimes called Goat Pepper, and *C. baccatum*, sometimes called Bird Pepper, have greater pungency, and the former is generally described as the true Cayenne Pepper. *C. ceraciforme*, with a small cherry-like fruit, and therefore called Cherry Pepper, and *C. grossum*, with a large, oblong, or ovate fruit, known as Bell Pepper, are frequently cultivated.—The fruit is used either ripe or unripe, except for making Cayenne Pepper, for which ripe fruit is employed. The fruit brought from South America is sometimes sold by druggists under the name *Guinea Pepper*.

CA'PSTAN, on shipboard, is a ponderous mass of timber, whose uses are to heave the anchor, hoist up masts and guns, take in and discharge cargo, &c. It has very firm supports on the deck underneath it. It comprises a *barrel*, round which a rope or a chain coils; *whelps*, or pieces of timber, which enlarge the diameter without greatly increasing the weight: the *drum-head*, a polygonal flat piece of timber at the top, pierced laterally with holes; the *step*, or lowest part, which rests upon and is bolted to the beams; the *saucer*, an iron socket let into the top of the step; the *pivot* or *spindle*, which, resting on the saucer, forms the axis around which the C. turns; the *pawls*, short bars of iron, to prevent the re-action of the C.; *bars*, which enter the holes, and are the levers for enabling the sailors to work the C.; *pins* placed vertically through the drum-head, for temporarily retaining the bars in their places; and a *shifter*, a rope connecting the outer ends of the bars. Among many improvements made in the arrangement and action of capstans is Wardill's, for increasing the bite or holding of a chain-cable around the circumference. In large vessels they are generally worked by steam.

CA'PSULE, in Botany, a dried fruit, *syncarpous* (or formed of several carpels united together into one), and opening either by valves, as in the fox-glove, primrose, and rhododendron, or by pores near the summit, which some regard as a sort of valves, and of which beautiful examples may be seen in the poppy and snapdragon. Capsules are either one-celled or many-celled. The *Pyxidium* is a variety of C., which opens as if cut around near the summit, presenting the appearance of a cup with a lid, of which a very beautiful example may be seen in the *Anagallis*, or Pimpernel; and another in the great woody fruit of the different species of *Lecythis* and other *Lecythidaceæ*.

CA'PTAIN, Military, is perhaps the most general designation given to an officer of land forces; something equivalent to it being found in most European languages. As a word, it simply means a *head* or *leader*, and may be applied to a chief over any number of men. *Captain-general* is in some countries a very high command. In the time of Queen Elizabeth, there was, among other high military officers, a Captain-general of footmen. In the organization of the British army at the present day, there is one C. to every *company* of infantry, and every *troop* of cavalry. Formerly every battery of artillery had two captains—a first and a second, the latter being called C.-lieutenant. Now, the first in command has the title of major, and the second that of C. The first in command of a battery of artillery, even when styled C., was considered higher than a C. of infantry or cavalry, and was privileged to be mentioned by name in military despatches like colonels and majors.

The duty of the C. is to see to the men of his company in everything that relates

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to discipline, exercises, billeting, pay, settlement of accounts, mess, kit, clothing, arms, ammunition, accoutrements, stores, barracks, cooking, etc.; to receive orders concerning these matters from the major, and to enforce these orders among the men. He is responsible to the major, and is assisted in his duties by the lieutenant and sub-lieutenant. The number of captains on the peace establishment of the British army, in its several branches, are about 239 cavalry, 1286 infantry, 248 artillery, 115 for engineers, and 28 for colonial corps—1866 in all, in full commission. The former value of a C.'s commission, and the circumstances of purchase connected with it, are noticed under COMMISSIONS, ARMY.

CAPTAIN, Naval, is the general designation for the commander of a ship. It is not universal, for some vessels of war are commanded by officers lower in rank than C.; while the chief officer of a merchant-vessel is often called *master*. The commanders of all rated ships are captains. The captains rise to the command of larger and larger ships, with increase of pay, according to length of service. The C. is responsible for everything on shipboard, in discipline, navigation, equipment—all, in short, that concerns the *personnel* or the *matériel* of the ship. If his ship belongs to a particular fleet or naval station, he is responsible to some admiral or commodore; if not, he is directly responsible to the Admiralty. The C. of that particular ship in a fleet which carries the admiral is called *flag*-C., and is for the moment higher in rank than others. A naval officer is always on half-pay, except when attached to a ship in actual commission; and thus in times of peace there have been always more naval captains on half than on full pay; but recent measures have been adopted to assuage this evil. The number of captains in the naval service during peace are about 83 in commission on full-pay. About 142 are on half-pay, under the designation of the *active* list; these are eligible for re-employment; while on the *reserved* list and the *retired* list there are 426 more. They rank in dignity with lieutenant-colonels in the army, and with colonels, after three years' service.

The word C. is used in other ways also in the navy. The *C. of the fleet* is a temporary officer in large fleets; he promulgates the admiral's orders, and receives all the reports and returns, filling, in short, a post equivalent to that of *Chief of the Staff* in an army. Among the seamen on board a ship, the chief of each gang is called C.; such as the *C.* of the after-guard, of the forecastle, of the hold, of the main-top, of each gun, &c.

CA'PTION, in the practice of the law of England, may be defined as that part of a legal instrument which shews the authority under which it is executed, or taken, as the word implies. It also states the time and place of the execution. The word C. is also improperly used in England to signify an arrest—a meaning which it strictly and technically bears in Scotland, where, until the passing of the 1 and 2 Vict. c. 114, called the Personal Diligence Act, which authorises more simple forms of legal process, it was the only recognised civil warrant for the apprehension of a debtor or obligee. This word is also used in Scotland to denote a summary warrant of imprisonment, granted on the application of the clerk of court, for the purpose of forcing back the pleadings and other papers in a lawsuit, which had been borrowed by the party against whom the C. has issued, and by whom they are unduly and illegally retained. See on the subject of this article INDICTMENT, COMMISSION, DILIGENCE, WARRANT, HORNING.

CA'PTIVES. It is laid down by Blackstone, that, as in the goods of an enemy, so also in his person, a man may acquire a sort of qualified property in him as a captive or prisoner of war—at least till the ransom of the captive is paid. In Scotland, all legal proceedings against a captive are stopped till his liberation, although, in some cases, execution against his estate may proceed.

CA'PTURE may be simply defined as prize taken in time of war. The law on this subject is stated with precision in a paper addressed on behalf of the British government to the American ambassador at London in September 1794: "When two powers are at war, they have a right to make prizes of the ships, goods, and effects of each other, upon the high seas. Whatever is the property of the enemy, may be acquired by capture at sea; but the property of a friend cannot be taken, provided he observes his neutrality. Hence the law of nations has established—that the goods of an enemy on board the ship of a friend may be taken—that the

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lawful goods of a friend on board the ship of an enemy ought to be restored—that contraband goods going to the enemy though the property of a friend, may be taken as prize; because supplying the enemy with what enables him better to carry on the war, is a departure from neutrality." The procedure to be adopted for determining whether the C. be or be not lawful prize, is now regulated by the 8 and 4 Vict. c. 65.

During the Russian war in 1854, there appeared in the "London Gazette," under date the 28th March of that year, a declaration stating, *inter alia*, that her Majesty would waive the right of seizing enemy's property laden on board a neutral vessel, unless it be contraband of war, and that it was not her Majesty's intention to issue letters of marque for the commissioning of privateers. The right of seizing enemy's property on board a neutral vessel, whether contraband of war or not, had always before been maintained by England. On the re-establishment of peace with Russia, a treaty was signed, and the following declarations adopted: 1. Privateering is and remains abolished; 2. A neutral flag covers an enemy's goods, with the exception of contraband of war; 3. Neutral goods, with the exception of contraband of war, are not liable to C. under an enemy's flag; 4. Blockades, in order to be binding, must be effectual—that is to say, maintained by force sufficient to prevent effectually access to the coast of the enemy.

As to the right to property captured from the enemy, and its distribution as prize or booty of war among the officers and men of the army and navy, see BOOTY and PRIZE.

CA'PUA, a fortified city of Italy, in the province of Caserta, beautifully situated in a rich plain, on the left bank of the Volturno, about 18 miles north of the city of Naples, with which it is connected by railway. It is a military station of the first class, its defences having been greatly extended and improved by Vauban. As it is the only fortress which guards the approach to Naples from the north, it was regarded as one of the keys of the former kingdom of that name. The only objects of interest in the city are the cathedral, with some splendid granite columns from ancient *Casilinum*, upon whose site C. was built in the 9th c.; the church of the *Annunziata*, with some bas-reliefs; and the arch of the *Piazza dei Giudici*, under which many ancient inscriptions still exist. Pop. (1871) 12,174.

The ancient *Capua*, which enjoyed a reputation for wealth and population second only to Rome and Carthage, was situated about two miles south-east of the present city, where its ruins are still to be seen, its site being occupied by the modern town of Santa Maria di Capua. C. was founded by the Etruscans, under the name of *Volturnum*, as early, according to some authorities, as 800 B. C., and was the chief city of the twelve said to have been founded by them in this part of Italy. Its present name was derived from the Samnites, who captured it in 423 B. C. After the battle of Cannæ, 216 B. C., the popular party opened the gates to Hannibal, whose army was greatly enervated by its luxurious winter quarters here. The Romans obtained possession of the city in 211 B. C. In the 5th c., A. D., C. was devastated by the Vandals under Genseric. It recovered its prosperity again to some extent, but it was totally destroyed by the Saracens in 840. The citizens, who had fled to the mountains, were induced by their bishop to return some 16 years later, and found the modern Capua. From the existing remains of the walls and fortifications of ancient C., it has been estimated that it had a circumference of 5 or 6 miles. It had seven gates. Among the Roman antiquities, one of the most remarkable is the amphitheatre, built of bricks, and faced with white marble. Well preserved arches, corridors and seats for spectators, still remain. It is calculated to have been capable of holding 60,000 persons, and must have been altogether one of the most magnificent buildings of the kind in Italy.

CA'PUCHIN MONKEY, or Capuchan Sapajou, a name often given to *Cebus capuchinus*, and some other species of the genus *Cebus*, South American monkeys, which have the head covered with short hair, so disposed as to resemble the cowl of a capuchin, the face being almost naked, or only covered with a little down. See CEBUS. *Pithecia chiropotes*, a South American monkey of a genus allied to *Cebus*, is also sometimes called the C. M., or Capuchin of the Orinoco.

CA'PUCHINS, a branch of the order of *Franciscans* (q. v.), so designated from the *capuche* which is their head-dress.

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CA'PUDAN-PASHA', the High Admiral of Turkey. He has the entire command of the navy, and the management of all naval affairs. The port of Pera, the Turkish islands in the Archipelago, and a number of seaports and maritime districts, are under him, even in their civil administration.

CA'PULETS and Mo'ntagues, the English spelling of the names of the Cappelletti and Montecchi, two noble families of Northern Italy, chiefly memorable from their connection with the legend on which Shakspeare has founded his play of "Romeo and Juliet." According to tradition, both families belonged to Verona; but this does not appear to have been the case. The Cappelletti were of Cremona, and the fact that their burying-ground and the tomb of Juliet are shewn at Verona, only proves how easy it is, in a country of ruins like Italy, to connect fact with fable. It has also been asserted that one family was Guelf and the other Ghibelline; but this is disproved by a reference to them in the "Purgatorio" of Dante (canto vi. l. 106). The poet is blaming the Emperor Albert for neglecting Italy, the very garden of his domain. "Reckless man," he says, "come see how the Montecchi and the Cappelletti are oppressed;" and the context shews that the Guelfs were the oppressors in both cases of these great Ghibelline families. The Emperor Albert was murdered in 1308, and this event has supplied the Veronese with a date for their legend. The first publication in which we recognise the essential incidents of Shakspeare's play is the novel "La Giulietta," by Luigi da Porto, printed in 1535, after the death of the author. He states, in an epistle prefixed to the work, that the story was told him "by one Perigrino, a man fifty years of age, much experienced in the art of war, a pleasant companion, and, like almost all the Veronese, a great talker." In 1554, Bandello published in his collection of tales another Italian version of the legend. It was entitled "The unfortunate Death of two unhappy Lovers, one by Poison and the other of Grief." Both writers fix the date of the event by saying it took place when Bartholomew dalla Scala or Scaliger ruled Verona. A French version of the tale was published by Pierre Boreteau in Belleforest's "Histoires Tragiques." It was translated into English in 1567, and published in Painter's "Palace of Pleasure." About the same time, Arthur Brooke published an English poem on the same subject, entitled "The Tragical History of Romeus and Juliet, written first in Italian by Bandell, and now in English." There is evidence that an English play had appeared previously, and that before Shakspeare's time the story was so well known in England that it had supplied subjects for tapestries. Shakspeare's play seems to have been principally based on the English poem. It was Brooke who first called the Montecchi Montagues, and the Prince of Verona Escalus, instead of Scala. Wright and Cary, in translating Dante, have followed the example of Shakspeare, and puzzle English readers by referring to the "Capulets and Montagues" as Ghibelline families. The historical date of the tragedy has not, however, been adopted by modern stage managers and Shakspearian critics, who very properly bring down the action from the beginning to the close of the 14th c., when commercial opulence, and the revival of arts and letters, supply accessories more in keeping with the drama than the ruder age to which history must assign the "civil broils" and the fall of the Capulets and the Montagues.—See notes to Dante in "Classici Italiani," and Knight's and Dyce's "Shakspeare."

CA'PUT MO'RTUŬM VITRI'OLI, or Colcothar, is the name given by the alchemists to the red powder (mainly red oxide of iron) which remains in the retorts when green vitriol or the sulphate of iron is calcined.

CAPY'BARA (*Hydrochœrus Capybara*), a quadruped of the order *Glires* or *Rodentia*, and of the family *Cavidæ*, strongly resembling the Cavy or Guinea-pig, although it is the largest existing rodent known, and aquatic in its habits. It is a native of South America, and abounds in many of the large tropical rivers. It is equal in size to a small pig. The dentition resembles that of the cavy, except that the grinding teeth are composed of numerous transverse plates, the number of the plates increasing as the animal advances in age; an interesting point of resemblance to the dentition of the elephant, and a link of connection between the rodents and the pachydermata. The C. feeds exclusively on vegetable food, browsing on the grass near the rivers, and often committing great ravages in plantations of sugar-cane. It runs badly, but swims and dives well, and has the power of remaining under water for seven or eight minutes. It is very inoffensive, and easily tamed.

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The flesh, except that of old males, is good, and is eaten by all classes of persons. The C. is sometimes called Water-hog, of which *Hydrochærus* is a Greek translation. In Demerara, it is called Water-horse, a corruption of the Dutch *Water Haas* —i. e., water-hare.

CARA'BIDÆ, a tribe of beetles, or coleopterous insects, of the section *Pentamera* (see COLEOPTERA), corresponding with the genus *Carabus* of Linnæus, but of which the species are extremely numerous, those already known being numbered by thousands. They mostly feed on other insects, worms, &c., and are extremely voracious and active, habits which are fully shared by their larvæ. Some of them burrow in the earth; most of them live under stones, under the bark of trees, among moss, &c.; and their bodies are adapted to this mode of life, being very firm and hard. Their legs are in general pretty long, and most of them pursue their prey rather by the use of their legs than of their wings, some of them indeed being wingless, or having only rudimentary wings. Many of them exhibit much beauty of colors and metallic lustre. The largest British species is only about an inch long, but some foreign ones are much larger. Some of the species of the restricted genus *Carabus* are among the most common British insects. Their wings are not fitted for flight. —A very large and singular insect of the tribe C. is *Mormolyce phyllodes*, a native of Java, which, in consequence of the extremely depressed form of its body, resembles some of the *Mantidæ* (q. v.), and the insects known as Leaf-insects (q. v.). To this tribe belong also the Bombardier Beetles (q. v.).

CA'RABOU. See REINDEER.

CA'RACAL (*Felis Caracal*), a species of Lynx (q. v.), found in the warmer parts of Asia, and throughout the whole of Africa; and more probably than any European species, the lynx of the ancients. It is larger than a fox, about the same height, but much more powerful; of a uniform deep brown or wine-red color, except two spots near each eye, the under parts of the body, and inner parts of the legs, which are white, and tufts of long black hair which terminate the ears. The C. is powerful enough to tear a hound to pieces. It is often represented as of a very savage disposition; but it is capable of being tamed, and has been employed in hunting.

CARACA'LLA, properly named MARCUS AURELIUS ANTONINUS BASSIANUS, a Roman emperor, the son of the Emperor Septimius Severus, was born at Lyon, 188 A. D. He was playfully named by his father Caracalla, from his long hooded tunic, made in the fashion of the Gauls, and so called in their language. After his father's death, 211 A. D., he ascended the throne as co-regent with his brother Publius Septimius Antoninus Geta, whom he afterwards caused to be murdered. Having bribed (at enormous cost) the Prætorians to overlook this foul deed, and to make him sole emperor, C. next directed his cruelty against all the friends and adherents of Geta, of whom twenty thousand of both sexes—including the great jurist Papinianus—were put to death. Innumerable acts of oppression and robbery were employed to raise supplies for the unbounded extravagance of the despot, and to pay his soldiers. In his famous constitution, he bestowed Roman citizenship on all his free subjects not citizens—who formed the majority, especially in the provinces—but simply in order to levy a greater amount of taxes on releases and heritages, which were paid only by citizens. In his campaigns, he imitated, at one time, Alexander, at another time, Sulla; while his main object was to oppress and exhaust the provinces which had been in a great measure spared by the tyranny of former emperors. In 217 he was assassinated, at the instigation of Macrinus, prefect of the Prætorians, by one of his veterans named Martialis, on the 8th of April 217, on the way from Edessa to Carrhæ. Historians paint the life of C. in the darkest colors. Among the buildings of C. in Rome, the baths—Thermæ Caracallæ—near Porta Capena were most celebrated, and their ruins are still magnificent.

CARACARA, or Caracara Eagle (*Polyborus*), a genus of birds of prey peculiar to America, and regarded as a connecting-link between eagles and vultures; agreeing with the former in their strongly hooked bill and claws, but with the latter in their naked face and propensity to prey on carrion. The name C. is originally Brazilian, and is derived from the peculiar hoarse cry of a common Brazilian species (*P. Braziliensis*), a bird of very fine plumage, and about 50 inches in expanse of wings,

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which is of frequent occurrence over a large extent of the American continent, and is sometimes to be seen even in the southern part of the United States.

CARA'CAS, the capital of the republic of Venezuela, the most northerly state in South America, with Guiana on the e., and Colombia on the w., is situated in lat. 10° 30′ n., and long. 67° 5′ w., 16 miles s. of La Guayra, its port, with which it is joined by railway. It is 2880 feet above the tide-level, enjoying from this elevation a healthy air and a temperature so moderate as to average 68° and 72° F., in February and June respectively. Standing immediately above the confluence of four streams, it is well supplied with cool water, which is distributed by means of fountains, pipes, and reservoirs. The neighborhood is subject to earthquakes—12,000 citizens having, in 1812, perished from this cause. The population in 1873 amounted to 48,897. The streets are straight and regular. The most splendid edifice is the Church of Alta Gracia for the people of color, excelling the cathedral in the richness of its decorations. C. has a university founded in 1778.

CARACAS, the province of which the foregoing city is the capital, extends in n. lat. from 7° 38′ to 10° 46′, and in w. long. from 65° 30′ to 68°, and contains 300,000 inhabitants. With a generally mountainous interior, the immediate coast is flat, presenting, besides La Guayra above mentioned, several harbors or roadsteads. The exports of the province are cocoa, coffee, dye-woods, hides, indigo, and sarsaparilla.

CARA'CCI, a celebrated family of Italian painters, the founders of the Bolognese school of painting.

CARACCI, LUDOVICO, the son of a butcher, was born at Bologna, 1555. As a student, he was so inapt that his master recommended him to abandon the pursuit; but instead of that he went to Venice and Parma, making acquaintance with the works of the great masters there, and returned to Bologna imbued with art principles quite opposed to the superficial mannerism then prevailing in his native city. In conjunction with two of his cousins, who, instructed by him, had imbibed the same ideas, he founded, in spite of great opposition, the school which afterwards became so famous in the history of painting. The first principle of this new school was, that "observation of nature ought to be combined with imitation of the best masters." The allied artists found numerous pupils, to whom they gave practical instructions in drawing from natural and artistic models, with theoretical lessons on perspective, anatomy, &c. So great was their success, that, in the course of a short time, all other schools of painting were closed in Bologna. Some of the finest works of this master are preserved in the *Academia delle Belle Arte*, Bologna—among others, the "Madonna and Child Throned," "Madonna and Child Standing," the "Transfiguration," and the "Nativity of St. John the Baptist." Ludovico died in 1619.

CARACCI, AGOSTINO, cousin of Ludovico, was born (1558) in Bologna. He became a disciple of his cousin, but he was of too versatile a genius to devote himself closely to any subject, though his magnificent painting of the "Communion of St Jerome" proves that he might have attained to very great eminence, had he devoted his undivided attention to the art; but he was in the habit of abandoning his easel for literature, poetry, and engraving on copper. As an engraver, indeed, he holds an important position in Italian art. He accompanied his younger brother, Annibale, to Rome, and there assisted in some of the paintings in the Farnese gallery; but his brother, who was a slave to his art, soon quarreled with him for his inattention, and he left Rome, and went to Parma. He died in 1602.

CARACCI, ANNIBALE, brother of Agostino, was born (1560) in Bologna, where he learned, under his father, the business of a tailor, from which he was called away by Ludovico Caracci. His progress in the study of painting was rapid, and at first he took principally for his models Correggio, Titian, and Paul Veronese. His picture of "St Roche distributing Alms," first gained for Annibale C. a wide reputation. His fame reached Rome, and he was employed to paint the Farnese Gallery there, which is considered his greatest work, and the manner of which partakes somewhat of Raphael and Correggio. On this gallery he was employed some eight years, and he received for his work the incredibly paltry sum of 500 crowns. In disgust and vexation, the artist threw aside his pallet. He died in Rome in 1609, where his remains were interred, close to Raphael's tomb, in the Pantheon. Annibale C. was one of the greatest followers of Correggio, and in composition ap-

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proached most nearly to the style of Raphael. Ludovico had a greater talent in teaching, and Agostino had a more versatile invention, but Annibale was unquestionably the greatest artist of the three Caracci.

CARACCI, ANTONIO, natural son of Agostino, was born at Venice 1583, died in 1618. He was a pupil under Annibale, and painted some excellent pictures.

CARACCI, FRANCESCO (styled FRANCESCHINI), brother of Agostino and Annibale, was born in 1595, and distinguished himself as an eminent designer. He died 1622.—The best Italian masters of the 17th c.—Domenichino, Guido, Reni, Albani, and others—proceeded from the school of the Caracci.

CARACCI'OLI. The name of a Neapolitan family unfortunately associated with the memory of Lord Nelson. Several members of this family were employed in political offices.—LOUIS ANTOINE DE C., born in Paris 1721, died 1803, was the author of a pseudograph, entitled *Lettres Intéressantes du Pape Clement XIV.*, which mystified many readers throughout Europe.—FRANCESCO C., a meritorious Neapolitan admiral, entered in early life the marine service, and distinguished himself at Toulon, 1793. In the year 1798, the offensive conduct of the court of Naples toward C. induced him to return from Palermo, where the court was then residing, to Naples, where he entered into the service of the republic established by the French invaders, and, with a few vessels, prevented the attempted landing of a Sicilian and British fleet. In 1799, when Ruffo took Naples, C. was arrested, contrary to the terms of capitulation, sentenced to death by the junta, hanged on the mast of a frigate, and his corpse thrown into the sea. This affair, to which Lord Nelson was a consenting party, is a stain on the reputation of the English Admiral.

CARA'CTACUS, a king of the Silures, who inhabited South Wales, was one of the most persistent enemies of the Romans in Britain. For nine years he warred gallantly against the invaders, but at length was completely overthrown. His wife and daughters fell into the hands of the victors, and his brothers surrendered. C. himself fled to Cartimandua, queen of the Brigantes, who delivered him up to the Romans. He was carried to Rome 51 A.D., and exhibited to the people by the Emperor Claudius. When he approached the imperial seat, we are told, he addressed Claudius in so noble a manner, that he and his relatives were immediately pardoned. They appear, however, to have lived during the remainder of their lives in Italy.

CA'RADOC SANDSTONE and Ba'la Beds, a division of the Lower Silurian System, so named from their development at Caer Caradoc, in Shropshire. They consist of sandstones, grits, and slates, with occasional beds of limestone. Enormous masses of contemporaneous igneous rocks are interstratified with them. They attain a thickness of 9000 feet, not including the igneous rocks. Fossils are very abundant in some beds. They consist chiefly of Trilobites (q. v.), Brachiopoda (q.v.), and Graptolites (q. v.).

The Silurian rocks in the Southern districts of Ayrshire belong to this division.

CARA'GLIO, a town of Northern Italy, in the province of Coni, six miles west of the city of that name. It is situated on the Grana, and has manufactures of silk. Pop. (1872) 8379.

CARAMA'NIA. See KARAMAN.

CARA'MBOLA, an East Indian fruit, of the size and shape of a duck's egg, but with five acute angles, or longitudinal ribs. It has a yellow, thin, smooth rind, and a clear watery pulp, in some varieties sweet, in others acid, of very agreeable flavor. It is often used in making sherbets, and in tarts and preserves; and is known to the British in India as the *Coromandel Gooseberry*. It is one of the most universally cultivated and abundant of the fruits of India. It is produced by the *Averrhoa Carambola*, a small evergreen tree, or bush, of the natural order *Oxalideæ*. The BILIMBI, or BLIMBING, is the very acid fruit of another species of the same genus, *A. Bilimbi* also East Indian. Both species are now much cultivated in the tropical parts of America. Both exhibit an irritability of leaf resembling that of the sensitive plant; they also display in a remarkable degree the phenomena known to physiologists as those of Sleep (q. v.) in plants.

CA'RAMEL is the name applied to the dark brown and nearly tasteless substance produced on the application of heat to sugar (q. v.). It is likewise formed during the roasting of all materials containing sugar, such as coffee, chicory, and

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malt (see BEER), and is one cause of the dark color of porter and infusions of coffee. It is also employed in the coloring of whisky, wines, vinegar, &c.

CARAMNA'SSA, a river in the presidency of Bengal, which rises in lat. 24° 34 n., and long. 83° 46' e., and, after a course of about 150 miles, enters the Ganges from the right in lat. 25° 28' n., and long. 88° 58' e. It is remarkable on several grounds. Though, on issuing from its source, it is clear as crystal, it is yet said to be both nauseous and noxious—a peculiarity which the natives impute to various supernatural causes; about 50 miles from its mouth, it is crossed by a stone bridge of three wide arches, which forms part of the grand road from Calcutta to Delhi; and lastly, it is so exceptionally subject to floods, that it has been known to rise 25 feet in a night, when scarcely any rain had fallen in the adjacent plain of the Ganges itself.

CARA'NA RESIN, more commonly, but less correctly, called Gum Carana, is a resinous substance imported from the tropical parts of America. Its properties and uses resemble those of tacamahac. It is entirely soluble in alcohol, and melts in a slight heat. It is not well known what tree produces it.

CARA'NJA, an island on the east side of the ordinary entrance of the harbor of Bombay (q. v.), separated from the mainland by a narrow and unserviceable channel of four miles in length. It is itself two miles broad, being comparatively level and fertile, with the exception of two hills—the Little Hill in the north, and the Great in the south.

CARANX. See SCAD.

CARAPA, a genus of plants of the natural order *Meliaceæ*, natives of warm climates. *C. Guianensis*, or *guareoides*, sometimes called the Andcraba, also the C. tree, is a large tree with beautiful shining pinnate leaves, which have many leaflets, a native of Guiana and the adjacent countries, where its bark has a great reputation as a febrifuge, and the oil obtained from its seeds is much used for lamps. Masts of ships are made of its trunk. The oil, which is called Oil of Carapa, is thick and bitter, and is anthelmintic.—*C. Touloucouna*, or *Guineensis*, an African species, yields a similar oil, which is employed by the negroes for making soap, and for anointing their bodies, its bitterness protecting them from the bites of insects, a purpose to which the Oil of C. is also applied in South America.—These species are very similar, and are supposed by some botanists not to be essentially distinct.

CA'RAPACE, the dorsal shield or buckler of chelonian reptiles (Tortoises and Turtles), and of the *Crustacea Malacostraca*, (Crabs, Lobsters, &c.). In animals so widely different, however, there is only a general similarity in the appearance of the C., and the purpose which it serves; its organic relations are very different. For notice of these, we refer to the articles CHELONIA and CRUSTACEA.

CA'RAT, originally, it would seem, the name given to the seeds of the Abyssinian Coral Flower (q. v.) or Coral-tree (*Erythrina Abyssinica*); but these, which are small, and very equal in size, having been used in weighing gold and precious stones, C. has become the designation of the weight commonly used for weighing precious stones, and particularly diamonds. The seeds of the Carob (q. v.) tree have also been said to be the original C. weights of jewellers, but with less probability.

Goldsmiths and assayers divide the troy pound, ounce or any other weight, into 24 parts, and call each a C., as a means of stating the proportion of pure gold contained in any alloy of gold with other metals. Thus, the gold of our coinage and of wedding-rings, which contains $\frac{22}{24}$ of pure gold, is called "22 carats fine," or 22 C gold. The lower standard used for watch-cases, &c., which contains $\frac{18}{24}$ of pure gold, is called 18 C., and so on. The C. used in this sense has therefore no absolute weight; it merely denotes a ratio. This, however, is not the case with the C. used for weighing diamonds, which has a fixed weight, equal to $3\frac{1}{6}$ troy grains, and is divided into quarters, or "C. grains," eighths, sixteenths, thirty-seconds, and sixty-fourths. These C. grains are thus less than troy grains, and therefore the jeweller has to keep a separate set of diamond weights.

CARAVA'CA, a town of Spain, in the province of Murcia, about 39 miles north-west of the city of that name, is situated on the slope of a hill crowned with a fine

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old castle. Its principal streets are wide, clean, and well paved; it has a fine church, with a miraculous cross, that is annually taken down and bathed in the waters of the town, to which it is supposed to communicate sanitary properties. It has manufactures of linen and woollen fabrics, soap, paper, leather, &c. Pop. about 10,000.

CARAVA'GGIO, a town of Northern Italy, in the province of Bergamo, about 24 m. e. of Milan. In the principal church are some esteemed paintings by Campi; and C. is also celebrated as the birthplace of the painters, Poligoro Caldara and Michael Angelo Merighi, both surnamed Caravaggio. In the neighborhood is a sanctuary of the Madonna, built from designs of Pellegrini (1575). Pop. about 6000.

CARAVA'GGIO, Michael Angelo Amerighi or Merighi da, a celebrated Italian painter, was born 1569, at Caravaggio in Lombardy, Northern Italy. His father, who was a mason, employed him in making paste for the fresco-painters, and in this way the artistic genius of the boy was stirred. After studying the works of the great masters in Milan and Venice, he went to Rome, where he lived for some time in very reduced circumstances. At length, a picture of his attracted the notice of Cardinal del Monte, who now patronised the young artist; but the ferocious and quarrelsome character of C. soon involved him in difficulties. Having fled from Rome to Malta, on account of manslaughter, he obtained the favor of the grand-master by painting an altar-piece in the church of St John, and other pictures. His quarrelsome nature soon forced him to flee from Malta; and in making his way back to Rome, he was wounded, lost all his baggage, caught a violent fever, and on reaching Porto Ercole, lay down on a bank and died (1609), at the age of 40. Trueness to nature was the object aimed at by C., who left all schools, and devoted himself to paint life as he found it in lanes, alleys, and other resorts of the lower classes. He studied no such matters as refined sentiment or elevation of realities, but gave in his paintings expression to his own wild and gloomy character. One of his best paintings, "The Fraudulent Gamblers," is preserved in the Sciarra Gallery at Rome. His shadows are deep, his backgrounds very obscure; in consequence of which the whole picture seems to possess a kind of mysterious greatness, that is very imposing. Even Rubens confessed that C. was his superior in chiaro-oscuro. When he painted sacred subjects, he remained falsely faithful to the low realities of Italian life: so that several of his pictures painted for churches, had to be removed from their places, because they could not be harmonised with sacred associations. Kugler, the German critic, has justly said of one of C.'s most celebrated works, a "Burial of Christ," that it appears "like nothing better than the funeral of a gipsy-chieftain."—An earlier Italian painter of less eminence, POLIDORO CALDARA DA CARAVAGGIO, was born in 1495, and murdered in 1543.

CA'RAVAN (from the Persian *karvan*, i. e., trader), the name given to the great assemblages of travellers which, at stated times, traverse the deserts of Asia and Africa. Many caravans are entirely for the purposes of trade, the merchants associating themselves for mutual help and protection. A C. sometimes has so many as 1000 camels, which follow each other in single file, so that it may be a mile or more in length. The most celebrated caravans are those formed by pilgrims going to Mecca, particularly those which annually assemble at Cairo and at Damascus. The latter consists of 30,000 to 50,000 pilgrims, and is under the special protection of the Turkish sultan. The caravan by which the Persians travel to Mecca starts from Bagdad, and is the vehicle of a very important trade. The great Indian caravan to Mecca, which started from Muscat, has been long given up. Mecca, upon the arrival of the caravans, bringing goods from so many different parts of the world, presents all the appearance of a vast fair. The trade between Tripoli and the interior of Africa is exclusively carried on by caravans, likewise that between Darfur and Egypt. The great trade between Russia and China is also a caravan trade. In the East, caravans in which the camels have a load of 500 to 600 pounds are called *heavy* caravans; *light* caravans are those in which the camels have only half that weight, so that the daily journeys may be longer. *Heavy* caravans travel from 17 to 18 miles a day; *light*, from 22 to 25. The caravans are generally conducted with great regularity, and assemble at and start from stated places on stated days. The leader of the Mecca-caravans, is called Emir-el-Hadsch, i. e., Prince of the Pil-

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grims. In trade-caravans, a leader, who is called Karwan-Baschi, is elected by the merchants from their own number.

Among the knights of Malta, caravans meant the troops of knights appointed by the order to serve in garrisons, and also the cruises of their galleys against the Turks.

CARAVANCES. See CHICK PEA.

CARAVA'NSARAI, or Khan, an eastern institution, a sort of unfurnished inn to provide travellers with a shelter. Those in towns and cities, which are generally built for traders, and charged a small sum a day, are handsomer and more convenient—having doors to the apartments—than those met with on the roads or outside the walls of the cities. They commonly consist of a square building of four wings built around a court-yard in which the beasts of burden may be enclosed, and where there is usually a well of water; the lodgings are small rooms, about 7 or 8 feet high, which run around the courtyard, and are bare of every article of furniture.

These caravansarais are an institution of very ancient date, being the "inns" of Gen. xlii. 27, xliii. 21; and it was in the stable of such a place, there being no room for his parents in the lodging apartments, that our Saviour was born (Luke ii. 7). They belong either to government, to some private individual, or are the property of the church (mosques); those situated in towns or cities are charged, but not more than two or three Turkish piastres a day; those situated on the road are usually free. There are some large and very handsome caravansarais at Cairo, Damascus, Beyrout, Aleppo, &c. The steward or keeper of a C. is called a *caravanserraakier*.

CA'RAWAY (*Carum carui*), a plant of the natural order *Umbelliferæ*, growing abundantly in meadows and rich pastures in the middle and south of Europe, and in some parts of Asia, naturalised in many places in Britain. In some parts of Holland and Germany, and also in the counties of Kent and Essex in England, it is extensively cultivated for its aromatic seeds—in more strict botanical language, *carpels*—which are used medicinally as a carminative and tonic, and are also very much used as an aromatic condiment, and by confectioners, distillers, and perfumers, entering into the preparation of liqueurs, cakes, sweetmeats, scented soups, &c. They depend for their aromatic properties on a volatile oil called Oil of C., which is obtained by bruising C. seeds, and distilling them with water, and is at first limpid and colorless, but becomes yellow, and subsequently brown by keeping. Oil of C. is used medicinally to relieve flatulence, and to correct the nauseating and griping tendencies of some carthartic medicines; also in the preparation of *Spirit of C.* and *C. Water*.—Spirit of C., which may be prepared either by dissolving the oil of C. in proof-spirit, or by distilling bruised C. seeds along with proof-spirit, is much used in Russia and Germany as a liqueur (*Kümmel-branntwein*), sweetened with sugar. —C. has a branching stem 1—2 feet high, with finely divided leaves, and dense umbels of whitish flowers. The fruit is oblong, each carpel having five thread-like ribs, with a single *vitta* (see UMBELLIFERÆ) in each of the interstices. The white carrot-shaped root of C. is sometimes used like carrots or parsnips, but has a very strong flavor.—C. has a great enemy in the CARAWAY MOTH (*Hæmylis daucella*), the larva of which destroys both its stem and flowers.

CARBAZO'TIC ACID, or Pi'cric Acid, is a substance of great importance in dyeing, which is obtained by the action of a strong nitric acid and heat on many complex organic materials, such as silk, indigo, salicine, and a variety of resins. On a commercial scale, it is best obtained from the oil of tar, which distils over from crude tar between 300° and 400°, or from the resin of *Xanthorrhœa hastilis*. The hot nitric acid solution is strained from impurities, and on cooling, yellow crystals separate of C. A., which can be purified by washing with cold water. These crystals are readily soluble in alcohol and ether, and dissolve in 80 or 90 times their weight of cold water, yielding a yellow solution, which has a very bitter taste, and stains the skin yellow; and when silk which has been treated with a mordant of alum, or cream of tartar, is immersed in a solution of C. A., it is dyed of a beautiful permanent yellow color. The bitter taste of C. A. has led to its being fraudulently employed, instead of hops, in communicating a bitter taste to beer.

CA'RBIDES, formerly termed CARBURETS, are compounds of carbon with metal. None of them occur in a natural state.

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CA'RBINE is a light kind of musket, named probably from the Carabins. See next article. It is now used by the cavalry, the yeomanry cavalry, the Irish constabulary, and other corps. The best carbines are now rifled. A considerable number of American carbines, rifled and breech-loading, were purchased at a high price by the English government in 1856. This American C. has a barrel only 22 inches in length, and a total weight of 7¼ lbs. It is simple in construction, has a great range, hits a mark with accuracy, may be fired with rapidity, requires little cleaning, can be loaded without a ramrod, and supplies itself with caps from a reservoir in the hammer. Among English makers, Mr Prince has successfully applied the breech-loading principle to carbines. The Victoria Cavalry C. has a barrel 26 inches long, with 0·733 inch bore; its weight is 7¼ lbs., and it is fired with 2¼ drachms of powder.

CARBINEE'RS, or Carabinee'rs, are said to have derived their designation from the Arabs, among whom the *Carabins* or *Karabins* were light horsemen, stationed at outposts to harass the enemy, defend narrow passes, &c.; in action, they took the place of skirmishers. A corps under the same name was raised in France in 1560; but the designation has not been much used in that country since the introduction of Hussars and Lancers. In the English army, C. was at one time a frequent designation for cavalry; but now there is only one regiment, the 6th Dragoon Guards, known by this title; and the distinction between them and other cavalry is little more than nominal.

CARBOHY'DROGENS, or Hydroca'rbons, are a series of compounds belonging to organic chemistry, which are composed of carbon and hydrogen, in such proportions that the various members of the group differ from each other in definite and regular numbers of atoms of carbon and hydrogen. The best marked group of hydrocarbons commences with Methylene (C_2H_2), which may be regarded as the first step in the ladder, and by the successive addition of other two atoms of carbon and hydrogen, we obtain Ethylene or Olefiant Gas (C_4H_4), Propylene (C_6H_6), Butylene or Oil Gas (C_8H_8), Amylene ($C_{10}H_{10}$), &c. There are also series beginning with Methyl (C_2H_3), then Ethyl (C_4H_5), and with Hydride of Methyl or Marsh Gas (C_2H_4), then Hydride of Ethyl (C_4H_6). The members of these groups are likewise characterised by a gradual ascending difference in their chemical and physical properties, especially the boiling-point, which rises by a given amount.

CARBO'LIC ACID, or Phe'nic Acid, (C_6H_6O), is the principal acid substance procured during the distillation of coal-tar. It is produced also by the distillation of gum benzoin and the resin of *Xanthorrhœa hastilis*, and is present in the urine of the cow and some other animals. It crystallises at ordinary temperatures in colorless needles. It smells like tar or creasote, and has a hot taste. It is a powerful antiseptic, and quickly arrests all putrefactive and fermentive changes. Hence it is used, freely diluted in water, as a dressing in the antiseptic system of treating wounds, first practised by Mr Lister, when Professor of Clinical Surgery in Edinburgh University. It is also used for purifying or rendering inoffensive Sewage (q. v.), &c.

Since the article on this substance first appeared in the "Encyclopædia," much has been ascertained regarding its uses, both as a therapeutic agent and as a disinfectant. It has been introduced into the new British Pharmacopœia (1867), where its characters and tests are thus described: "In colorless acicular crystals, which at a temperature of 95° become an oily liquid, having a strong odor and taste resembling that of creasote, which it also resembles in many of its characters and properties. Its specific gravity is 1·065; boiling point, 370°. The crystals readily absorb moisture on exposure to the air, and they are thus liquefied; the acid, however, is but slightly soluble in water, but it is freely soluble in alcohol, ether, and glycerine. It does not redden like litmus paper; a slip of deal dipped into it, and afterwards into hydrochloric acid, and then allowed to dry in the air, acquires a greenish-blue color. It coagulates albumen. It does not affect the plane of polarisation of a ray of polarised light. It may be taken internally in doses of from one to three grains in the same class of cases as those in which creasote is prescribed. Its principal uses are as external applications, in which, in various degrees of dilution, it is serviceable in unhealthy ulcerations, gangrenous sores, ozena and all fetid discharges, gleet, the destruction of lice, and especially, as Professor Lister has shewn, as an application in compound fractures (in which it coagulates all albuminous effu-

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tions, and forms a solid crust, impermeable to air, over the broken surface), and to abscesses immediately after they have been opened. Indeed, it is most probable that his investigations on the treatment of abscesses will, like those on the treatment of compound fractures, lead to a total alteration in this department of surgery. The observations of Pasteur and others have shewn that, in even apparently the purest air, numerous organic germs are always floating. In a hospital ward, these germs are multiplied to an extraordinary degree. In any wound exposed to the atmosphere (as a compound fracture), decomposition takes place by the action of these germs, and hence it is necessary to introduce the carbolic acid, which has the power of destroying these germs, into the interior. In an unopened abscess, no septic organisms are present, and the object of the surgeon is to guard against their introduction from without, and at the same time to afford a free exit for the discharge of the contents of the abscess. The following are the outlines of Professor Lister's mode of proceeding: A square piece of rag is dipped in a solution of one part of crystalised carbolic acid and four parts of boiling linseed oil, and is laid upon the skin where the incision is to be made. The lower edge being raised, a scalpel dipped in the oil is plunged into the cavity of the abscess, and a sufficient opening made; and the moment the knife is withdrawn, the raised part of the rag is dropped upon the skin as an antiseptic curtain, beneath which the pus escapes. The cavity of the abscess is firmly pressed, so as to remove as nearly as possible all the existing pus, and if it should seem expedient, a piece of lint dipped in the oily mixture may be introduced, so as to check bleeding and prevent primary adhesion of the cut surfaces. "Thus," says Professor Lister, "the evacuation of the original contents is accomplished with perfect security against the introduction of living germs. This, however, would be of no avail unless an antiseptic dressing could be applied that would effectually prevent the decomposition of the stream of pus constantly flowing out beneath it." He finds that the most suitable dressing is made as follows: Six tea-spoonfuls of the oily solution are mixed with common whiting (carbonate of lime) so as to form a putty, which is spread upon six inches square of common tin-foil, strengthened with adhesive plaster to prevent its tearing. The tin thus spread with putty is laid upon the skin, so that the middle of it corresponds with the point of the incision, the antiseptic rag used in opening the abcess being removed the moment previously. The tin is then fixed with adhesive plaster, the lowest edge being left free for the escape of the discharge into a folded towel placed over it, and secured with a bandage. The dressing must be removed every day, and a piece of rag dipped in the oily solution must be placed on the incision when the first tin is removed, so as to guard against the possibility of the entrance of germs during the cleansing of the skin with a dry cloth, and pressing out any discharge that may exist in the cavity. If a piece of lint was inserted into the wound, it must be removed when the tin is applied. From the absence of the irritation excited by decomposition, pus almost at once ceases to be formed under this treatment; and large abcesses, after their original contents have been evacuated, often yield in 24 hours only a few drops of serum in the course of a few days. The Pharmacopœia gives the glyceride of carbolic acid (consisting of one part of the acid to four of glycerine) as a good form for local application; but the proportion of acid must vary with the case.

The value of carbolic acid as a disinfectant is placed beyond all doubt by the investigation of Mr Crookes, made at the request of the Royal Commissioners, who were appointed to obtain information and report on the cattle disease. As an account of his experiments is reprinted, in a very cheap form, from the Appendix to their Third Report, and is accessible to every one, we will merely insert the recommendation of the Commissioners: "That the use of carbolic acid should become general throughout the country in uninfected as well as in infected districts. There is little doubt that even were there no danger from cattle-plague, the great purifying effect of the substance on the air of cattle-sheds would contribute greatly to the health of the animals."

CARBON is one of the elementary substances largely diffused in nature. It occurs uncombined in the mineral graphite or Black-lead (q. v.), and in the Diamond (q. v.), which is pure crystallised carbon. It is much more abundant, however, in a state of combination. United with oxygen, it occurs as Carbonic Acid (CO_2) (q. v.) in the atmosphere, in natural waters, in limestone, dolomite, and

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ironstone. In coal, it is found combined with hydrogen and oxygen; and in plants and animals, it occurs as one of the elements building up wood, starch, gum, sugar, oil, bone (gelatine), and flesh (fibrine). Indeed, there is no other element which is so characteristic of plant and animal organisms, and it ranks as the only element never absent in substances obtained from the two kingdoms of organic nature. Wood-charcoal, coke, lampblack, and animal charcoal are artificial varieties, more or less impure, of carbon. The atomic weight or equivalent of C. is 6 (new sys. 12); the specific gravity greatly varies; that of the diamond is 3·330 to 3·550 (water being 1·000), and of graphite 1·800. C., in its ordinary forms, is a good conductor of electricity; in the form of a diamond, it is a non-conductor. Of heat, the lighter varieties of C., such as wood-charcoal, are very bad conductors; graphite in mass has very considerable conducting powers. At ordinary temperatures, all the varities of C. are extremely unalterable; so much so, that it is customary to char the ends of piles of wood which are to be driven into the ground, so as by this coating of non-decaying C. to preserve the interior wood; and with a similar object, the interior of casks and other wooden vessels intended to hold water during sea-voyages, are charred (coated with C.), to keep the wood from passing into decay, and thereby to preserve the water *sweet*. Its power of arresting odors and colors likewise varies much. See BONE-BLACK. In the simple property, even of combustion, there is a marked difference. Wood-charcoal takes fire with the greatest readiness, bone-black less so; then follow in order of difficulty of combustion—coke, anthracite, lampblack, black-lead, and the diamond. Indeed, black-lead is so non-combustible, that crucibles to withstand very high heats for prolonged periods without breakage or burning, are made of black-lead; and the diamond (q. v.) completely resists all ordinary modes of setting fire to it. In the property of hardness, how soft and velvet-like does lampblack feel to the touch, and yet how hard is that diamond which cuts glass, and is the hardest of all gems, and indeed of all things!

Carbon for electrical purposes.—When C. is obtained of sufficient density, it is found to be a good conductor of electricity, and to make an excellent electro-negative element in a galvanic pair. Graphite displays these qualities to advantage, and so does the hard incrustation of C. that is found sublimed in gas retorts. Coke and wood-charcoal are too porous to possess them to any great extent. The scarcity of graphite, and the precarious supply of retort-C., preclude the possibility of obtaining much practical advantage from the electrical properties of C. with these substances alone. We are indebted, however, to Professor Bunsen of Heidelberg for the discovery of a process whereby a C. of the requisite density can be manufactured with great ease and economy. The carbons thus obtained for galvanic batteries rival platinum in electric energy, and they have aided in no small degree, from their cheapness, in heightening the utility of galvanic electricity. The Bunsen carbons, as manufactured in Germany, are of the form of hollow cylinders, whereas those made in France and this country are solid rectangular prisms. The following are the more important details of the process. Two parts of coke, and one of baking coal—the proportion varying to some extent with the materials—are ground to a fine powder, and passed through a sieve. The powder so got is transferred to iron-plate moulds of the required shape, the seams of which are merely clasped together, and luted with clay. No pressure is employed in filling them, other than that of shaking. When the moulds are filled, they are placed in a furnace, and kept there till all carburetted hydrogen has escaped from them. They are then taken out, and allowed to cool before the mass within is removed, which is now found to have taken a solid form, and to be so hard that it may be turned or ground to the exact size wanted. At this stage, the carbons are destitute of electrical action, and they must consequently be rendered more dense by a subsequent process. This consists in soaking them thoroughly in thick sirup, or, better still, in gas-tar thickened by boiling, and laying them aside till dry, after which they are packed with charcoal-dust in fireproof crucibles, and exposed for a considerable time to a high heat. If one soaking and charring is not enough, the same may be repeated until sufficient density is obtained. Throughout the process, it is essential that all flaming matters be driven off, so as to leave only the C. in the mould; and care must be taken that no air be admitted to the mould when under the action of heat, otherwise there would be a loss of C.

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from combustion. The manufacture of these carbons may be carried on contemporaneously with that of gas. The sticks of C. used for the electric light are obtained by sawing up either C. made by this process or the C. of the gas retorts.

CARBONA'RI, (literally, "colliers" or "charcoal-burners"), the name of a secret political society, first, in some degree, made known in 1820. The constitution, like the precise objects of the C, still remains in a great measure secret: though they have printed instructions, catechisms, statutes, rituals, &c., for their associates. The statements respecting the high antiquity of this secret Confederacy are fabulous. There is every reason to believe that it originated during the last French *régime* in Naples. Botta, in his "Storia d' Italia," states that, under Murat's government, the Neapolitan republicans, equally hating the French and King Ferdinand, escaped into the wild defiles of the Abruzzi, and here, naming themselves "C.," formed a secret society. It is said that their leader, Capobianco, had great powers of popular eloquence, and that their motto or war-cry was, "Vengeance for the lamb torn by the wolf!"

The peculiar phraseology of the C. is taken from the vocation of charcoal-burners. For instance, they are (or were) wont to speak of "clearing the forest of wolves." The "wolves" probably meant at first foreign tyrants; but in the course of time, after the restoration of the Neapolitan Bourbons, such symbolical expressions had reference to *their* despicable misrule. Among themselves, the initiated were styled "good cousins." The various societies do not seem to have possessed a common centre, or to have been properly organized for combined action. A place of meeting was styled a "hut" (*baracca*); the external neighborhood "the forest;" and the interior of the hut was the *vendita* or "place for selling coal." A union of several of these huts formed a "republic." The superior huts (*alte vendite*) at Naples and Salerno endeavored, but without success, to effect a centralisation of the Carbonari. The society, soon after its institution, numbered 24,000—30,000 adherents, and increased so rapidly in Italy that, in March 1820, it is said that as many as 650,000 new members were initiated, including considerable number of the military and the clergy. The religious and Protestant character of the order is expressed in its statutes, which include the article: "That every Carbonaro has the natural and unalterable right of worshipping God according to his own convictions." Though Carbonarism did not arise from the lodges of freemasons (as several have supposed), it has borrowed many forms of masonry.

After the restoration of the Bourbons, several secret political unions were formed in France, and in 1820 were confederated with the Carbonari. Paris, after the prosecutions against the secret societies of Italy, was made the head-quarters of a Carbonarism which, adopting all the symbolic phraseology, rules, and regulations of the Italian societies, received from the rapidly systematising genius of the French, an organic character which it had never before possessed. The initiated styled themselves *bons cousins*, and spoke of the uninitiated as *pagani*, (heathens). Written documents and communications were strictly prohibited by the heads of the union, and treachery was to be punished by assassination. After the close of the French and Spanish war, the C., whose activity in contriving plots had excited the terror of the French prefects, restricted its endeavors to the circulation of republican ideas, without direct attempts towards insurrection. After the July revolution, several of the leading French C. attached themselves to the new régime, and their society was gradually dissolved. In its place, the new "Charbonnerie Démocratique" was founded, having for its object the establishment of a republican government, founded on the principles of Babeuf (q. v.). The endeavor of these new C. to make Paris the centre of all political movements, led to the secession of the Italian refugees, who associated themselves under the title "Young Italy." French Carbonarism is not *known* to exist at present, and it is possible that even in Italy the triumphs of constitutional patriotism during recent times have rendered its existence no longer necessary, but it certainly was alive at the commencement of the Franco-Sardinian war with Austria; and one of the rumors of the time was, that the French Emperor—who, in his young republican days, had been a member of this society—had entered on the war of liberation, to conciliate his old associates, who had menaced him with the fate of a traitor.

CA'RBONATED or Aci'dulous Waters are those which contain a great excess of

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carbonic acid gas. The amount of gas in ordinary spring and well waters does not amount to more than 3—8 cubic inches in 100 cubic inches of the water; but in waters entitled to be called C., the proportion of gas to 100 cubic inches of water rises 30—60, when they are considered rich; 100—200 when they are very rich; and in the waters of St Nectaire it is said that the proportion of gas is as high as 4.00 volumes to 100 of the water. These waters sparkle much when poured from one vessel to another. The carbonic acid is free, but is generally accompanied (1) by bi-carbonate of soda, when the water is called *carbonated-alkaline* or *acidulo-alkaline*, as in the Seltzer, Pyrmont, Salzbrunn, Altwasser, and Reinerz acidulous mineral springs; or (2) by carbonate of iron, when the water is named *carbonated* or *acidulous chalybeate*. See CHALYBEATE WATERS. The mineral spring at Irkeston, near Nottingham, is the only water of this nature in Britain. The C. or A. W. are very refreshing and exhilarating, and are useful in certain disordered states of the stomach; they relieve nausea, and generally increase the discharge of liquid from the system. They are objectionable in the case of persons of a full and inflammatory state of body.

CARBO'NIC ACID, Fixed Air, or Choke-damp, is a substance occurring free as a gas in the atmosphere, to the extent of 1 volume to 2500 of air, and also in combination with a variety of substances. It is most easily prepared for experimental purposes from chips of marble, water, and hydrochloric acid, which are placed in a gas bottle with tubes. The hydrochloric acid (HCl) acts on the marble ($CaO.CO_2$), and forms chloride of calcium (CaCl), water (HO) and carbonic acid (CO_2) which escapes as gas with effervescence, and may be conducted by a proper tube under the mouths of jars filled with water and placed on a pneumatic trough. Where C. A. is required in large quantities, it is prepared in a leaden vessel from chalk ($CaO.CO_2$) and sulphuric acid (SO_3) diluted with water, when sulphate of lime (CaO,SO_3) is formed, and C. A. escapes as gas.

The atomic weight or equivalent of C. A. is 22; it is a clear, colorless gas, with a pleasant, acidulous smell and taste. Under great pressure and cold, it can be condensed into a liquid, and even a solid resembling snow in appearance. Under ordinary atmospheric pressure, C. A. dissolves in water to the extent of 2 volumes of gas in 3 of water; but under increased pressure, a very much larger amount of gas is taken up by the water, and in this way the various kinds of AERATED WATERS (q. v.) are prepared. The gas is more than half as heavy again as ordinary air, being 1529. It is incombustible, and a non-supporter of combustion, at once extinguishing a lighted candle, gas jet, or even a piece of burning phosphorus, when these are placed in a jar filled with the gas, or even in a mixture of C. A. and air. This power of putting out flame and fire has been turned to account in the extinguishing of burning coal mines, where, all the openings to the mine being properly secured, C. A., in the form of the spent air from an ordinary coal-furnace has been passed into the mine, with the result of successfu ly stopping the fire. It is irrespirable in a concentrated form, producing spasm of the glottis, which prevents the admission of the gas into the system; and when mixed with air, it can be breathed without suspicion, and then acts as a narcotic poison, even when present only to the extent of 4 or 5 per cent. of the air. The deadly effects of C. A. are observed, in the combustion of charcoal, coal, or *coal-gas*, in chauffers, furnaces, or in fireplaces with the dampers down, when the deadly fumes of C. A. steal more or less quickly over the inmates of the room, and they almost unconsciously become its victims—thus unknowingly following the course of the Parisian suicide, who purposely lights a charcoal fire in the centre of his room, and prepares for death; and in overcrowded rooms where the C. A., exhaled from the lungs of each inmate at every breath, poisons the air of the apartment, and day by day slowly but surely robs the robust of health, and ultimately of life. In such cases as the Black Hole of Calcutta (q. v.), where there was scarcely any outlet for the poisonous gas, only a few hours may be required to complete the catastrophe.

Though poisonous when inhaled by the lungs, C. A. is rather refreshing when taken into the stomach. Thus, aërated beverages of all kinds—beer, champagne, and carbonated mineral waters—owe their refreshing and invigorating qualities to the presence of C. A.; and if the gas be allowed to escape, they become almost tasteless, stale, and mawkish.

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Besides abounding everywhere in the atmosphere, C. A. is largely evolved from fissures in the earth, especially in volcanic districts. In the *poison or Upas valley* of Java, which is a valley of an oval form, about ¾ of a mile in circumference, and 30 to 35 feet deep, the carbonic rises to a height of about 18 feet from the surface, and the whole bottom of the valley is devoid of vegetable and animal life, and is strewn here and there with the bleached bones of man and other animals that have unluckily stepped within the deadly circle. A dog thrown in, dies in 14 seconds; and birds attempting to fly across the valley, instantly drop down dead. In the neighborhood of the lake of Laach, in Rhenish Prussia, the amount of C. A. evolved every day has been estimated at 600,000 lbs. weight. In a state of combination, C. A. forms an ingredient in a great number of minerals called *carbonates*, such as chalk, limestone of various kinds (CaO,CO_2), black-band iron-stone carbonate of iron, FeO,CO_2), malachite (carbonate of copper, $CuO,HO+CuO,CO_2$), &c. C. A. is the principal product of combustion; the carbon of the burning substance (coal, candle, coal-gas, wood, paper, &c.) uniting with the oxygen of the atmosphere, and forming C. A. (CO_2). It is also a product of respiration (q. v.), and is evolved more or less largely by all animals, not only by the mouth, but in exhalations, from the skin, and is present in blood, urine, &c. It is evolved during the fermentation (q. v.) of beer, wine, &c., and often remains in brewers' vats when the liquor has been drawn off. During the decay of vegetable and animal matters, C. A. is produced, and in explosions of fire-damp in coal mines, it is formed in large quantity, and fills the underground passages.

C. A. forms the largest ingredient in the food of vegetables, and is therefore abstracted in large quantity from the air by plants. It enters into combination with the majority of the oxides of the metals and other compounds, to form a class of salts called *carbonates*, several of which have been referred to. C. A. when present in a vessel in quantity may be recognised by the power of extinguishing a lighted candle, or by not burning itself. C. A. in the form of gas may be readily recognised in the the atmosphere by exposing a little lime-water in a saucer, or other shallow vessel, when the lime (CaO) abstracting the C. A. (CO_2) from the air, a white film of carbonate of lime or chalk (CaO,CO_2) is formed on the surface of the liquid. A solution of Baryta (q. v.) in water is more delicate in its action on the C. A. of the air, and more readily indicates its presence.

CARBONIC OXIDE is a compound of one atom of carbon and one atom of oxygen, is represented by the symbol CO, and has the atomic weight 16. It does not occur naturally, but may be observed burning with a pale-blue flame in fire-places and stoves, especially in frosty weather. During the combustion of the fuel at the lower part of the grate, the oxygen of the air unites with the carbon of the fuel to form carbonic acid (CO_2); and this gas rising up through red-hot coal or carbon (C), has part of its oxygen abstracted by the carbon, and two atoms of carbonic oxide (CO) are produced, which taking fire on the top of the coals, burn, with the characteristic blue flame, abstracting more oxygen from the air, and re-forming carbonic acid (CO_2). C. O. can be prepared for experimental purposes by heating a mixture of oxalic acid (HO, C_2O_3) and sulphuric acid (SO_3) in a retort, when the latter abstracts the water from the oxalic acid, and the other elements (C_2O_3) escape as carbonic acid (CO_2) and C. O. (CO). On passing the mixed gases through a solution of potash (KO), the carbonic acid is retained as carbonate of potash ($KOCO_2$), whilst the C. O. remains as gas. C. O. is a transparent, colorless gas, a little lighter than air, being 967, and has never been liquefied nor solidified. It burns with a blue flame, but is a non-supporter of combustion, and at once extinguishes a lighted candle introduced into it. It is very poisonous, and even when largely diluted with air, if inhaled, it produces a sensation of oppression and tightness of the head, and ultimately acts as a narcotic poison. It does not take part in any natural phenomena, nor is it put to any use in the arts and manufactures, and in these respects, affords a striking contrast to carbonic acid, which has so many duties to perform in nature and in the arts.

CARBONIFEROUS SYSTEM, the name given to the strata which, in geological order, rest upon the Devonian measures, and are capped by the Permian series. They derive their designation from the amount of carbon contained in them, for to them the great coal-fields of the world belong. In an economic sense, they are the

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most valuable series of rocks in the earth's crust, forming the great store-house from which is obtained the chief supply of coal, iron, and lime.

The rocks of the system are composed of a vast series of beds of sandstone, limestone, shale, and coal. In some coal-fields, these are so interstratified, that it is impossible to subdivide the strata in the order of time In the Edinburgh district, there are nearly 100 coal-seams, omitting all under six inches in thickness. Out of the whole depth of the strata, amounting to about 6300 feet, these seams occupy only 204 feet. The remainder consists of sandstone and shale in the upper half; towards the middle, limestones appear, and these increase downwards in the number and thickness of the beds, but are still intermixed with seams of coal The same arrangement exists in the other coal-fields of Scotland, as well as in those of the north of England In other districts, the limestone is confined to the lower portions of the measures, and separated from the coal-bearing strata, so as to form a natural subdivision of the system into—1. *The Coal Measures*, consisting of shale, sandstone, and grit, with occasional seams of coal; and 2. *The Mountain* or *Carboniferous Limestone*, a calcareous rock, containing marine shells and corals, and devoid of coal A coarse quartzose sandstone, passing into conglomerate, is occasionally developed to a considerable extent between these two divisions This is a local deposit, being almost confined to England, and may be considered as one of the coal sandstones, of coarser texture than usual Being occasionally used for millstones, it is called *Millstone grit*. It is accompanied with shales containing the usual coal plants, but generally without any true coal seams Another locally developed series of beds, consisting of indurated shales, sandstones, and grits, occurs below the carboniferous limestone in South Wales and Ireland, and is known as the *Lower Limestone Shales*. These rest conformably on a series of yellow sandstones, which have been generally referred to the Devonian Measures, but which, from their organic contents, as well as from their stratigraphical position, seem to be basement beds of the carboniferous series. The existence and development of these various beds in the United Kingdom will be better understood by an examination of the following table The maximum thickness of the beds is given in feet when known; the blanks shew the absence of the division from the particular coal-field:

	Edinburgh.	Glasgow	N. York.	Derby.	S. Wales	Kerry	Clare	N. Ireland.
Coal Measures	6300	2800	2000	2700	12,000	2000	2000	2200
Millstone Grit			400	1600	1,000			1800
Mountain Limestone			1659	1000	1,500	1500	3000	6400
Lower Limestone Shales					500	4650	150	1200
Yellow Sandstone						3000	unknown depth	2000

In the midland counties, the coal measures are the only portion of the carboniferous system present, and these rest on the Silurian or older rocks. In Devonshire, there occurs an extensive series of shales and sandstones, with a few beds of earthy anthracite or culm, associated with argillaceous rocks, probably belonging to the lower limestone shales, much indurated, and traversed by slaty cleavage.

From the great economic value of the contents of the C. S., we are better acquainted with its fossils than with any fauna or flora that flourished before the C S., we are better acquainted with its fossils than with any fauna or flora that flourished before the tertiary epoch. As coal is the result of the mineralisation of vegetable matter, the coal measures must necessarily abound in the remains of plants. No less than 294 species have been described as found in Britain alone. Numerous impressions of plants, as well as traces of structure, are found in the seams of coal themselves; but the more distinct forms are preserved in the interstratified beds of mud and ironstone, often in great number and exquisite beauty. Such remains consist chiefly of impressions of leaves separated from their branches; of casts of trunks, more or less in a broken state; and of roots much compressed, yet occupying their original position in the clay soil now indurated into shale; with these occur pieces of wood, or remains of trees, in which the vegetable texture is to

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some extent preserved. The great proportion of the plants seem to have flourished in marshy swamps, and to have accumulated where they grew, like peat, the material afterwards converted into coal. Hence a stratum of shale, in which are imbedded the roots of Sigillaria, Calamites, &c., is the invariable *floor* on which the coal seam rests. The chief coal plants are Lepidodendron (q. v.), Sigillaria (q. v.), Calamites (q. v.). Trigonocarpon (q. v.), and Ferns (q. v.). The existence of cone-bearing trees during this epoch, has been proved from the microscopic examination of prepared sections of fossil woods in which the small discs occur that are characteristic of and peculiar to the coniferæ.

The animal remains are as numerous and as well preserved as the vegetable. They are found chiefly in the limestone; the greater part, indeed, of this rock, is made up bodily of corals and crinoids. No other such accumulation for extent and variety is known; it has its nearest parallel in the somewhat similar formation now going on in the Southern Archipelago. The corals and crinoids were specifically as well as individually numerous. The terebratulæ and other allied forms of bivalve shells, though belonging to a comparatively limited number of genera, were very abundant. The more highly developed mollusca were also numerous; they belonged to a great number of generic types. But the most remarkable group was the fishes. At no time were they more abundant. They belonged to the Ganoid and Placoid groups of Agassiz. The Ganoids, having their entire surface covered with scales, were numerous; some of them inhabited shallow water near the shore, and fed on crustaceans and shell-fish, for crushing which they had a formidable apparatus of conical teeth of a very complicated structure. Others were inhabitants of deep water, and were more powerful and predaceous, and more rapid in their movements. Their jaws were produced into a long snout, like the crocodile of the Ganges, and armed with a double series of enormous teeth which were sometimes as much as four inches long by two inches broad, as in Megalichthys (q. v.). dimensions rarely attained even by the largest known reptiles. Associated with these were a great number of sharks belonging to the Cestracionti dæ (q. v.), a family of which we have only a single living representative. They were furnished with a long bony spine to strengthen the dorsal fin, and thus enable them to turn speedily in the water, as they required to do in seizing their prey. These spines are often found fossil. The only remains referred to a higher division of the animal kingdom yet found belong to the saurian Archegosaurus (q. v.), found in the coal-fields of Germany.

CA'RBUNCLE, a name given by lapidaries to the beautiful mineral called *Pyrope* (q. v), by mineralogists. The C. of the ancients appears to have been either pyrope, or the deep-red variety of noble garnet (see GARNET), which is in every respect very similar to it, or probably included both.

CARBUNCLE (Lat. *carbunculus*, a little coal) derives its name from the two prominent symptoms—a glowing fiery redness, and a burning pain. It consists of an inflammation, caused by some vitiated condition of the blood, or some atmospheric influence, attacking a patch of skin on the shoulders, nape of the neck, or indeed on any part of the body. The part swells slightly, feels hard, and this hardness extends deeply into the tissues; the pain is very severe, and the patient much depressed with loss of appetite, and general derangement of the secretions. As the disease advances, the redness assumes a dark purple or livid hue, the cuticle rises in blisters, and many small specks of matter appear on its surface, which discharge, and leave apertures like those in the rose of a watering-pot; through this a thin viscid fluid escapes, and occasionally a small slough or core of the true skin which has been killed by the disease. Sometimes these apertures meet, forming large openings, and in others the whole patch of skin sloughs and comes away.

The treatment of C. consists in restoring the secreting organs to a healthy condition, the agents for which must depend on the individual case; in supporting the patient's strength by easily digested food, wine, brandy and bark, with nitric acid; relieving pain by opiates, and encouraging suppuration with warm poultices; carrot, turnip, and yeast poultices being favorite applications in this disease. To prevent excessive loss of skin, the C. must be divided freely with a knife from one margin of the inflamed patch to the opposite one.

CA'RBURETTED HY'DROGEN is a term in chemistry applied to several compounds of carbon and hydrogen. Thus, light carburetted hydrogen (CH_2) is the

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gaseous compound popularly known as marsh gas and fire-damp, and is the principal constituent of coal-gas. See GAS. Heavy carburetted or bi-carburetted hydrogen (C_2H_2) is otherwise known as Olefiant Gas (q. v.).

CARCAJE'NTÉ, a town of Valencia, Spain, about 28 miles south-south-west of the city of Valencia, situated on a rich plain near the right bank of the Juncar. It is well built, with good streets, and has a palace belonging to the Marquis of Calzada. It has some manufactures of linen and woollen, and a trade in the agricultural produce of the district. Pop. about 7000.

CA'RCANET, a jewelled chain or necklace. Venice was famous for the manufacture of carcanets in the 15th century.

CA'RCASS, in military pyrotechny, is a hollow case of iron, sometimes globular, and sometimes ovate, filled with combustibles. It is fired from a mortar. Its chief use is to ignite buildings in an enemy's quarter, and to give sufficient light to aim the shot and shells. Carcasses are said to have been first used by one of the princely ecclesiastics of Germany, the Bishop of Munster, when he fought against the Duke of Luxembourg at Groll, in 1672. The oval carcasses, being uncertain in their flight, are now nearly abandoned. The round carcasses now made are chiefly those here indicated.

Diameter.	Composition.	Weight.
13 inch	18 lbs.	213 lbs.
10 "	7 "	100 "
8 "	3 "	51 "
5 "	19 oz.	17 "
4⅜ "	7 "	9 "

Carcasses are not intended to burst, but to send out, through holes, a furious and inextinguishable fire, which lasts from 3 to 12 minutes. The composition with which they are filled consists of saltpetre, sulphur, meal gunpowder, pitch, rosin, tallow, and Venice turpentine, about half being saltpetre. The composition is packed in tightly through one of the holes; and the holes are stopped with fuses adjusted to ignite the coposition after a certain space of time. Sometimes old pistol barrels, loaded to the muzzle, are introduced with the composition. Compare those details with CASE-SHOT, and SHELLS.

CARCASSONE, a town in the department of Aude, France, situated on the river Aude, and the *Canal du Midi*, about 55 miles south-east of Toulouse. It is divided into two parts, the old and new towns. The modern town is well built, with streets running at right angles to each other, squares adorned with trees, pleasant boulevards, and several marble fountains. The old town, built on a height, is much more picturesque, with its ramparts and towers, some parts of them dating from the time of the Visigoths, and the rest, with the castle, from the 11th or 12th century. This old town suffered greatly at the hands of the fierce bigot Simon de Montfort and his crusaders, who here burned 400 of the Albigenses. In the 14th c. it effectually resisted the Black Prince. The cloth manufactures are important, employing, it is said, upwards of 7000 people. C. has also manufactures of paper, leather, linen, and soap. Pop. (1872), exclusive of garrison, 18,396. The ancient name of the town was Carcaso, which was a place of some note in the time of Cæsar.

CARCHA'RIAS. See SHARK.

CA'RDAMINE. See CRESS, BITTER.

CA'RDAMOMS are the capsules of certain species of plants of the natural order *Scitamineæ* (q. v.), and belonging to at least two genera, *Amomum* and *Elettaria*. They are three-celled, and contain numerous wrinkled seeds, which form an aromatic pungent spice, weaker than pepper, and with a peculiar but agreeable taste. On account of their cordial and stimulant properties, they are employed in medicine, very generally to qualify other medicines; they are also used in confectionary, although not to a great extent in Britain; but in Asia they are a favorite condiment; and in the north of Germany, they are used in almost every household to flavor pastry.—The C. recognised in the British pharmacopœias, and called *True* or *Official C.*, also known in commerce as *Malabar C.*, are the produce of *Elettaria Cardo-*

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momum, a native of the mountains of Malabar and Canara. They depend for their qualities on a peculiar pungent essential oil, called *Oil of Cardamom*, which may be obtained from them by distilling them with water, and when fresh, is colorless. Other kinds of C. occur in commerce, but none is equal to the true C. in commercial value. The different kinds of C. differ not only in strength, but in the character of their aroma. The plants producing them have much general similarity.

CARDAN, Jerome, a celebrated mathematician, naturalist, physician, and philosopher, born at Pavia, September 24, 1501, was the illegitimate son of a physician and jurisconsult at Milan. He received his early education at home, and completed his studies in Pavia and Padua. After some years, he became professor of mathematics at Milan. Here his reputation began to grow. After a few years, he began to lecture on medicine, to the practice of which he ultimately betook himself. By 1546, his reputation had so increased, that he was invited by the king of Denmark to accept a professorship at Copenhagen, which, however, he declined; and in 1552, we find him proceeding to Scotland, on an invitation from Hamilton, primate of that country. He managed to cure the primate of an inveterate asthma, which had defied the skill of the most celebrated physicians, and returned to Milan enriched by the bounty of his patient. Here he again settled for some time. In the autumn of 1559, however, he removed to Pavia as professor of medicine, whence, again, in the same capacity, he removed to Bologna, where he continued teaching till 1570, when we find him imprisoned for debt. Having regained his liberty in 1571, he went to Rome to avoid his creditors. Here he was speedily admitted a member of the medical college, and pensioned by Pope Gregory XII. The rest of his life he spent without public employment, in Rome, where he died, September 2, 1576, a few weeks after finishing his autobiography. Some writers assert, but on no sufficient authority that he starved himself to death, to fulfill a prediction which he had made as to the time when he should die. It is certain, however, that he was a devoted astrologer, and cast horoscopes for himself and others. The fancifulness necessary to support the faith of an astrologer imbued all his scientific writings. These were very voluminous. A summary of his notions on physics and metaphysics is given in his two works—"De Subtilitate," in 21 books, and "De Rerum Varietate," in 17 books. On the whole, he wrote 132 treatises on physics, mathematics, astronomy, astrology, rhetoric, history, ethics, dialectics, natural history, music, and medicine. These, it need scarcely be said, abound in incoherent paradoxes, contradictions, and capricious abstractions, more than enough to overwhelm the few profound ideas which he originated. A formula for the solution of certain kinds of cubic equations is called "Cardan's formula," and was published by him, as by his own invention, in the "Ars Magna sive de Regulis Algebraicis" (1545); but it would appear that the formula was really the invention of one Tartalea or Tartaglia. In religion, C. was heterodox, and commonly reputed an atheist. His numerous writings were collected and edited by Charles Sphon (10 vols., Lyon, 1663).

CARDBOARD, or Card, is made by pasting together several layers of paper, according to the thickness and quality required. *Bristol-board*, used by artists, is made entirely of white paper; ordinary C., of fine white paper outside, with one or more sheets of coarse cartridge-paper between. According to the number of layers, they are called *three*, *four*, *six*, or *eight sheet* boards. *Mill-board*, used by bookbinders, as the basis of book-covers, is made of coarse brown paper, glued and strongly pressed.

The workman arranges the paper in the order required for pasting, and the pile, called a *head* is placed at his left hand, the paste-tub on his right. He lifts a sheet from the head with his left hand, brushes it over with paste with his right; then another is laid upon that and pasted, until he comes to the last required to complete the thickness of one board, when he removes two sheets, and only pastes the upper one, which thus forms the lower sheet of another board. This is repeated till the whole head is pasted, when it is removed to a press, and the water of the paste squeezed out at the edges. The boards are then separated, and dried by hanging them in a room artificially heated. The C., which is now rough and warped, is smoothed and flattened by making a pile consisting alternately of sheets of rough C. and copper plates, with a copper plate at top and bottom. This pile is passed be-

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tween iron rollers, and the smooth surface of the copper impressed upon the C., which is thus flattened and beautifully polished.

The enamelling of address cards is produced by brushing over the C. a mixture of *China* or *Kremnitz white* (a fine variety of white lead) and size. After drying, this surface is rubbed lightly over with a piece of flannel, previously dipped in finely powdered talc; it is then polished by rubbing vigorously with a hard close-set brush.

CA'RDIA, the upper orifice of the stomach, called, on account of its vicinity to the heart, by the same Greek name, *cardia*, and probably hardly distinguished from it in the earliest times of Greek medicine.

CA'RDIAC ME'DICINES, stomachic and stimulating remedies—cordials, so called from their action on the heart through the stomach. See CARDIA.

CARDIA'LGIA, pain of the heart or stomach (CARDIA). The name is commonly applied to the particular variety of pain called *heartburn*, arising from a disordered stomach, and accompanied with acid eructation. See INDIGESTION.

CA'RDIFF (*Caer-Taff*, Fort of the Taff), a parliamentary and municipal borough and seaport, one of the county towns of Glamorgan, South Wales, situated on the river Taff, 170 miles west of London by railway. The population has risen from 2000 in 1801, to 56,911 in 1871, with a floating population of about 5000. C., with Cowbridge and Llantrissant, returns one member to parliament. The town extends about one mile in each direction from the town-hall. Among the public buildings are the Glamorganshire and Monmouthshire infirmary, town-hall, free library and museum, county jail, law-courts, an infirmary, a county lunatic asylum, baths, and a theatre. There are also many private buildings of a superior character, and a public park. Of about 30 places of worship in C., only 4 belong to the Church of England.

The port of C. is the outlet for the large mineral and manufactured produce of the central portion of the South Wales mineral-field, in which are the populous districts of Merthyr-Tydvil, Rhymney, Aberdare, and the Rhondda Valley, with which this port is connected by the Taff Vale, the Rhymney, and the Ely Valley Railways, and the Glamorganshire Canal. The town is also one of the chief stations on the Great Western line from London to Milford-Haven. The Bute docks, east and west, with an area of 76 acres, constructed at the expense of the Bute estate, have cost upwards of a million sterling, and belong entirely to the present marquis. There are about 40 staiths on the quays of the docks, with machinery of a peculiar construction for the purpose of loading vessels with coal, by which the breaking of the coal is almost entirely prevented. Each of these staiths is capable of shipping 560 tons of coal in a day of 12 hours. There is also a tidal harbor, with 7 staiths, each capable of shipping 400 tons of coal per day, and a low-water pier 1400 feet in length. Height of water at spring-tide, 31 feet 8½ inches; at neap-tide, 21 feet 7½ inches. Width of sea-gates, 55 feet; length of quays, 11,100 feet; width of dock, 300 feet southern, and 500 feet northern part; depth, 25 feet. Exports during 1873—coal, 3,591,218 tons; iron, 154,570 tons; coke, 1276 tons. The quantity of coal exported has immensely increased. In 1875, 5459 vessels, of 1,170,-122 tons, entered the port, and 10,105, of 2,428,721 tons, cleared it. The imports to C. include copper ore, live cattle, salted provisions, foreign fruit and vegetables, corn and flour, &c. The Penarth Docks, about 3 miles to the westward, form another outlet for the trade of the district. Steamers ply between the port of C. and New York, London, Liverpool, Glasgow, Bristol, Cork, Whitehaven, and Burnham.

The assizes (half-yearly, alternately with Swansea) and the quarter-sessions are held at the Town Hall. The ancient city of Llandaff, now a mere village, is almost connected with Cardiff. Cardiff Castle, built in the 11th c., is partly now in ruins, and partly occupied by the Marquis of Bute, to whom nearly the whole of the modern town belongs. Robert Duke of Normandy, brother of Henry I., died in the castle, after being a prisoner for 28 years. Cromwell (1648) got possession of the castle by treachery, after bombarding it three days; and he afterwards hanged the traitor, as an example to his own soldiery. This town was anciently an important one, successively under the British, Romans, and Normans.

CA'RDIGAN (anciently, *Aberteif*, mouth of the Teify), the county town of Car-

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diganshire, a parliamentary and municipal borough and seaport, in the south-west corner of the county, on the right bank of the Teify, 3 miles from its mouth, and 239 miles north by west of London. The vicinity exhibits romantic scenery on the Teify, and grand rocks on the coast. The streets, except the chief one, are narrow and steep, the houses built of slate-rock. Pop. of the municipal borough (1871), 3461; of the parliamentary borough, 4939. With Aberystwith, Lampeter, and Adpar, C. returns one member to parliament. In 1875, 983 vessels, of 81,486 tons, entered and cleared the port. The general trade is confined to vessels of 20 to 100 tons. Vessels of 400 tons reach the town by spring-tides. C. became an important town about the Norman Conquest. The Normans were frequently defeated before mastering it. There are the remains of a castle on a low cliff on the Teify, which is supposed to have been founded, in 1160, by a Norman baron. The town suffered much in the struggles between the Welsh and the Normans. The Teify is said to have been the last British resort of the beaver.

CARDIGAN BAY, a semicircular bend of St George's Channel, on the west coast of Wales, 45 miles wide from north to south, and 20 miles deep, with a sweep of coast of 110 miles. Its exterior points are Brach-y-Pwll, off which lies Bardsey Isle, in Caernarvon, and Strum Head, in Pembroke. It receives the rivers Mawddach, Dovy, Ystwith, Yren, and Teify. It has 3 to 30 fathoms water, with three reefs. A strong current sweeps round the bay from south to north. Almost all the harbors on the coast are obstructed by bars. A great part of C. B. is said to have been once dry land, protected, as Holland now is, by dams and dikes, and containing 16 towns, and the land is said to have been submerged about 520 A. D.

CA'RDIGANSHIRE, a maritime county in South Wales, on Cardigan Bay, with an area of 675 square miles, a half being waste. The surface is hilly, interspersed with fertile valleys. A rugged, bleak range of hills runs through the middle of the county, from the south-west to the north-east, between the coast and the Teify, ending abruptly in a shelving beach in the middle of the coast, but on other parts there are rich flat tracts. The county contains little wood. The chief rivers are the Teify, which rises in a small lake near the centre of the county, and runs 70 miles south-east and east along the south border of the county, the Claerwen, Ystwith, and Rheidol. C. contains some romantic waterfalls, especially the Rheidol Falls and the Devil's Bridge, and above 20 small lakes or llyns, noted for their wild beauty. C. reposes on Lower Silurian slates and shales, containing few or no organic remains. Rich veins of copper, lead, zinc, and silver occur. The climate is cold and wet, but mild though wet on the coast. Snow lies long on the hills in winter. Summer is delightful in the valleys. C. is an agricultural county, and its chief branch of industry is the rearing of live-stock. The chief crops are oats, barley, and potatoes on the poor clay and peat soils of the mountains, and wheat, barley, and potatoes on the flat loams of the coast and valleys. The cattle and horses are small. There are some manufactures of coarse woollens and gloves, stockings and hats. Oats, barley, cattle, sheep, pigs, butter, slates, and woollens are exported. Cardigan is the county town; the other chief towns being Aberystwith, Lampeter, Adpar, Aberayron, Tregaron. C. sends one member to parliament. Pop. (1871) 62,712; registered electors, 5554. In 884, the king of C. became king of all Wales, under the title of Roderick the Great. He divided Wales among his three sons. After this, the Danes and Normans overran Cardiganshire. The county has many remains of British and Roman camps and roads, Druidical circles, cairns, and castles. Many Welsh princes and bards were buried in the abbey of Strata Florida, 16 miles south-east of Aberystwith, and some of the records of the principality were kept here. In C. there is a curious practice of sending presents (*biddings*) to a new-married couple, which, when sold, often realise £50 or £60. C. was disturbed, 1843—1844, by the Rebecca riots.

CA'RDINAL (Lat. *cardinalis*, principal, from *cardo*, a hinge). Cardinals are the highest dignitaries in the Roman Church after the pope, whose electors and councillors they are. The title, however, had at first a more general application. The pope being the sovereign bishop over the whole Romish Church, and having, as such, many duties to fulfil inconsistent with those of a particular diocese, had, from very early times, a number of bishops, priests, and deacons whom he appointed his vicars and coadjutors for the management of the diocese of Rome. The bishops

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exercised the episcopal function in the pope's stead, each having a peculiar church within the diocese. The priests were titular parsons of the churches in the city of Rome, and had the cure of souls. The deacons had charge of some churches and chapels of devotion, which they held as deaconries, with the additional duty of assisting the pope when he officiated in public. These three classes of ecclesiastics were called *cardinali* or *cardinales*, to denote that they were the first or chief over the rest, and that all the affairs of the diocese of Rome were under their direction. At a subsequent period, the priests and deacons of other cities of importance assumed the title of C., to distinguish them from other priests and deacons over whom they claimed supremacy; but the popes subseqnently ordained that none but those whom they had chosen should be honored with that title. Amongst those whom the popes thus appointed were the seven bishops *suburbicarii*, who took their titles from places in the neighborhood of Rome. These bishops were called *hebdomadarii*, because they attended the pope for a week each in his turn. These cardinals took part with the Roman clergy in the election of the pope, who was generally chosen from their number. About the beginning of the 12th c., the popes having formed a regular court, began to bestow the rank of C. priest or C. deacon on any individual of the clergy, or even of the laity, whom they chose to select; and to each, whether Roman or foreign, they gave the title of some particular church in Rome, but without attaching to it any obligatory service. Thus the cardinals became a separate body elected for life, and the officiating priests of the Roman parishes were gradually deprived of the title. In 1159, Nicholas II. limited the right of election to the popedom to the cardinals thus appointed, leaving to the rest of the clergy and people of Rome merely the right of approving of the election of a new pope, and to the emperor that of confirming it. Even these prerogatives, in course of time, were withdrawn. Notwithstanding the great powers thus intrusted to them, the bishops in the great council of the church continued to take precedence of the cardinals; and it was not till 1614 that Louis XIII. of France, in the sitting of the parliament of Paris, adjudged precedence to the cardinals over the ecclesiastical peers—bishops and abbots. The power of the popes to appoint cardinals has often been contested, and their right to precedence denied, by the other dignified ecclesiastics. In 1567, Pope Pius V. forbade any clergyman not oppointed by the pope to assume the title of C.; and Sixtus V., in December 1586, fixed their number at 70—viz., the 6 bishops suburbicarii, 50 priests, and 14 deacons, and on this footing they have since remained, though the number is seldom complete, the pope generally leaving some vacancies for extraordinary cases. The number has frequently fallen greatly under 70. When Nicholas III. was chosen pope, there were but eight cardinals; and a little before the death of Alexander IV., there were but four. Sometimes before Sixtus V., the number was exceeded, as in the pontificate of Pius IV., when there were 74. The body of cardinals is styled the Sacred College. Most of the cardinals reside in Rome, and either enjoy ecclesiastical benefices, or are employed in the administration. When not so provided for, the cardinals receive an allowance of 100 dollars monthly from the papal treasury. Some cardinals belong to monastic orders, and reside in their convents even after their election. The jurisdiction of the C. bishops in the place in which they are established is truly episcopal, but they are not obliged to reside. That of the C. priests and deacons is almost episcopal, but extends no further than the church and sacristy. They have there an episcopal seat under a canopy, like bishops, and they there solemnly give the people their blessing. The creation of cardinals is wholly in the pope. If the new-created C. is at Rome, he goes the same day to visit the pope, who puts the red cap on his head. The red hat, which Innocent IV. ordained that cardinals should wear, to shew that they ought to expose themselves to the shedding of their blood in the cause of the church, is afterwards given in a public consistory. A number of symbolical ceremonies accompany this investiture. The cardinals that are absent, when chosen have the cap sent them by a special messenger from the pope. The hat is given by the pope's own hands; and many cardinals who do not visit Rome, die, without ever having received it. The only exception is in favor of members of royal houses, to whom the hat is sent. Pope Urban VIII., in 1630, gave to the cardinals the title of Eminence, which they shared with the grand-master of the Order of Malta, and the ecclesiastical electors of the German or Roman Empire. The Pope often employs cardinals as ambassadors, and the individual thus employed is styled

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Legate *a Latere*. A C. legate acts, or recently acted, as governor of the Northern Provinces of the Papal States, which thence received the name of Legations. The chief secretary of state, the *Camerlengo* or minister of finances, the Vicar of Rome, and other leading officials, are always chosen from among the cardinals. The Council of Cardinals, when assembled under the presidency of the pope to discuss matters of church and state, is called the Consistorium. There are public consistories, which are held on great occasions, and correspond to the levees of other sovereigns; and private and secret consistories, which are the privy council of the pope. Moreri's "Dictionary, voce Cardinal," contains a list of cardinals from 1119 to 1724, with their names, countries, etc., and the dates of their election and death.

CARDINAL BIRD, or Red Bird, (*Guarica cardinalis*), also called cardinal finch, cardinal grosbeak, and Virginia nightingale, one of the finest song-birds of America, belongs to the family of *Fringillidæ*, and differs from the true grosbeaks (*Coccothraustes*) in having the beak slightly bulging. The general color of the male is red, the head being vermilion, and only a small portion of the plumage around the base of the bill being black. The feathers of the crown are long, and erected into a conical crest like a red cap. The C. B. abounds in Texas, Florida, and the Southern States of America generally, migrating northwards in spring, but never further than Massachusetts, where only a few stragglers are seen. Its loud, clear, sweet, and varied song is to be heard chiefly in the mornings and evenings. In size it exceeds any of the British *Fringillidæ*, being about equal to the starling.

CARDINAL FLOWER. See LOBELIA.

CARDINAL POINTS. See COMPASS, MARINERS'.

CARDINAL VIRTUES (Lat. *cardinalis*, chief, from *cardo*, a hinge). The C. V. of the ancients were Justice, Prudence, Temperance, Fortitude. They were so called because the whole of human virtue was supposed to hinge or turn upon them. In other words, they were considered as a full and comprehensive classification of man's various duties.

This mode of dividing the virtues is to be found as far back as Socrates. The ancient moralists treated under Ethics the whole sum of human duty and virtue. Thus, Aristotle considers the great problem of the science to be the determination of man's highest good, together with the means of realising it. Hence, he includes both the social virtues and the prudential regard to the welfare of the individual in the same scheme. Of the four C. V., it will be seen that the first, Justice, is the social virtue; that Prudence (which, properly speaking, includes Temperance also) regards the wellbeing of the individual; while Fortitude is necessary to both. This last was a virtue greatly esteemed in the ancient world, each one's lot being much less secure than with us in the present day; it was impossible to say what sufferings might be in store for the most prosperously situated of men.

Dr Whewell has made an attempt to correct the more obvious defects of the classification, and has substituted one which he deems free from those defects. The most notable omission, in the ancient scheme, judged from a modern point of view, is the absence of all reference, either expressly or by implication, to the virtue of Goodness or Benevolence. This was characteristic of the pagan moralists; for although good deeds were abundantly practised among the ancients, they did not account it a part of human virtue to flow out spontaneously in every kind of active benevolence including the most wicked and worthless among the objects of it. Aristotle, in discussing the various acts and outgoings of friendship, never loses sight of the *reciprocal* obligations on the other side; so that when a rich man befriends, with his wealth, one that is poor, the inequality must be made good by a greater amount of honor or respect on the part of him that is so befriended.

Accordingly, to adapt the classification to the altered point of view, Benevolence has to be added to the list. This is Dr Whewell's first virtue; the others are Justice, Truth, Purity, and Order. But the scheme, as thus amended, is scarcely less objectionable than before. The virtue named last, Order, which means obedience to authority, cannot but contain a very large portion of all the rest; seeing that Justice, Truth, &c., are enjoined by positive law. Then, what is understood by Purity, including the control of the two powerful appetites, Hunger and Sex, is partly prudential and partly social.

The ethical discussions of modern times may be very much aided, if we divide

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the totality of human virtue on the following plan. There are three distinct classes of human actions, which are all approved of or accounted virtuous, but on different grounds, and in a different manner.

1. There are actions which are forbidden by society under penalties; in other words, men are punished for committing them. Such are theft, breach of bargain, slander, violence to the person, and all the offences against our fellow-men that are prohibited by the law of the land. The avoiding of all these actions is signified to be a part of our duty, by the suffering inflicted on the doers of them. The law fines, imprisons, or puts to death those who will not conform to its regulations.

The law of the land is not the only power that prescribes conduct enforced by penalties. The public opinion of the country at large forbids certain actions, and punishes transgressors by excluding them from social intercourse; such, for example, are acts of unchastity, more especially when committed by women. There are also codes enacted by particular societies, as the code of honor among gentlemen, which constitutes some actions offences that are not so by law, or by universal opinion. Cowardice is one of the qualities most obnoxious to the code of honor.

The actions prohibited by law are obviously such as could not be allowed without the entire subversion of human society. If murder and theft were to go unpunished, the principal end for which men associate together in communities—that is, protection and security—would not be attained. It is impossible that we should not disapprove of all such actions, and approve of the contrary.

2. There are some actions that are accounted virtuous, while their opposites are not punished, as in the case of those now mentioned. Doing good to persons that have no claim upon us—in other words, benevolence or philanthropy—is considered highly praiseworthy; but the neglecting of this is not usually visited with any punishment or censure; so that if it be a duty to perform acts of benevolence, it is a duty generically different from paying our debts, and respecting the person and property of our neighbor. The motives brought to bear on the two cases are widely contrasted: in the one, we *punish* for doing the action forbidden; in the other, we *reward* for doing the thing enjoined, and inflict no punishment if that is neglected. Here lies the difference between *duty*, strictly so called, and *merit*. In the bare performance of duty there is no merit; a man would not even be commended for the punctual payment of his just debts, if it were not that many people are deficient in this respect, and in the comparison with these the correct person excites in our minds a feeling of satisfaction. *Disapprobation* is the sentiment properly concerned with duty, or rather, with breach of duty; *approbation* is bestowed on all who do something over and above their duty. This distinction is known in every department of practical life; while speculative moralists habitually lose sight of it.

3. The virtues included under Prudence are in a different position from either of the foregoing classes. Bearing the common names, virtue and duty, by which they are recognised as worthy of approbation or commendation, they are nevertheless unaccompanied with the sanctions either of punishment or of reward. The imprudent man is subject to no legal penalty, unless he clearly involves other persons in his imprudence; and the prudent man is not rewarded with the praise, esteem, or other benefits conferred upon the benevolent man. It is true that the young are punished by parents or teachers for imprudences; and some governments take such a paternal care of their subjects, as to punish them for sins against themselves. Men have been sent to prison, because of their endangering their own salvation by embracing heresy; but at the present day, such a proceeding is considered beyond the function of government. Men and women, arrived at maturity, are expected to take care of their own interests; even if they do not, no one punishes them; if they do, no one rewards them. We have, it is true, a certain feeling of disesteem in the one case, and of esteem or commendation in the other; neither of which, however, attains any considerable strength until more than the individual's self is involved. In short, although we cannot divest ourselves of all sentiment as lookers on, when men behave prudently or imprudently, our rule is *non-interference*; and this constitutes a marked distinction between the self-regarding and the social vices and virtues.

Accordingly, when ethical writers are endeavoring to probe the foundations of the moral sense in man, they ought to consider separately those three different species of conduct, for the sentiment excited by each is marked by strong peculiarities.

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To class social duties enforced by punishment, social virtues stimulated by rewards, and prudence, which is accompanied by neither, under one common designation, and discuss them as if they were essentially the same, is to confuse, instead of clearing up, the first principles of morality.

In Roman Catholic systems of theology, there are declared to be four *cardinal virtues*—"Prudence, Fortitude, Temperance, and Justice"—from which all other "moral" virtues are represented as flowing. But there is a prior division of virtues into the two classes of *theological* and *moral;* the theological virtues being Faith, Hope, and Charity. The distinction between these two classes is represented as consisting in this, that the theological virtues "*immediately* regard God;" and the moral virtues do not immediately regard God, but are commanded and rewarded by God, and are beneficial to ourselves.

CARDING OF COTTON, &c., the process of disentangling and arranging in parallel rows the fibres of cotton. This operation may be compared to the combing and brushing of one's hair, and the *card* combines the properties of the comb and brush, being a brush with wire teeth instead of hairs. These teeth are inserted in strips of leather, which are fixed upon the surface of a cylinder. Several such cylinders are arranged so that the ends of the teeth are nearly in contact; and the cotton being brought to them, is caught up, passed from one to the other, and combed out as the cylinders revolve in the form of beautiful films or fleeces, which are removed by a smaller drum-card, called the "doffer," and again from this by the "doffing-knife." These films, which are of the width of the drum, are next contracted to a narrow ribbon, by being passed through a funnel; and thus narrowed, are called the "card ends" or "slivers," and are now ready for the next process of "drawing" or "doubling." See SPINNING.

CARDI'NIA, a genus of fossil conchiferæ, containing 85 species, which extend from the Silurian to the inferior oolite. They have an oval or oblong shell, attenuated posteriorally, and marked with lines of growth, and an external ligament. They occur abundantly in the valuable layers of clay-ironstone called "mussel-bands." In Derbyshire, this material is wrought, like marble, into vases.

CARDI'TIS, or inflammation of the heart, a form of disease of very rare occurrence, if the term be limited in its application to cases of true acute inflammation of the muscular structure of the heart itself. C., however, was commonly understood in a wider sense, so as to include certain forms of disease of the external and internal lining membrane of the heart; and it is only since the beginning of the present century that, owing to the improvements in medical pathology and diagnosis, the names of Pericarditis and Endocarditis (q. v.) have come prominently into view as indicating the most ordinary inflammatory affections of the heart. See HEART, DISEASES OF THE.

CA'RDIUM and Cardiaceæ. See COCKLE.

CARDO'NA, a town in Catalonia, Spain, about 44 miles north-west of Barcelona. It is situated on a declivity on the right bank of the Cardener, is surrounded by walls, pierced with six gates, and commanded by a castle on a height. It is celebrated on account of a mountain of salt in its vicinity which has a height of about 500 feet, and measures a league around. When the sun shines on this gigantic mass, the effect is of the most brilliant and gorgeous description. Pop. about 2500.

CARDOON (*Cynara Cardunculus*), a perennial plant of the same genus with the ARTICHOKE (q. v.), a native of the south of Europe and the north of Africa. It very much resembles the artichoke, but is of larger size, whilst the flowers (heads of flowers) are smaller. It has long been in cultivation, for the sake of the blanched leaf-stalks and midribs of the leaves, which are used as a salad, or more generally as a boiled vegetable during winter.

CARDS. All that we know of C., for certain, is, that they are of ancient and eastern origin. What is asserted by Count de Gebelin and the earliest writers upon the subject, that in their primary stage they constituted some sort of symbolic and even moral game, is not so well established. The Hindu and Chinese C. are, however, emblematic in a very high degree—the former illustrating the ten avatars, or incarnations of the deity Vishnu; and the so-called paper-tickets of the Chinese typifying the stars, the human virtues, and, indeed, almost anything you please.

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The learned Sir William Jones expresses himself convinced that the Hindu game of *Chaturaji*—the Four Rajahs or Kings—a species of highly complicated chess, was the first germ of that party-colored pasteboard which has been the ruin of so many modern fortunes. In the wardrobe accounts of Edward I., there is an item of money paid for the use of that monarch for playing at the Four Kings—"ad opus regis ad ludendum ad *quatuor reges* viii.*s.* v.*d.*"—which is supposed to have been a game at C.; but how and when painted C. took the place of carved figures is still but matter of conjecture.

A pack of Hindustani C., in the possession of the Royal Asiatic Society, and presented to Captain Cromline Smith in 1815 by a high-caste Brahman, was declared by the donor to be actually 1000 years old. "Nor," quoth the Brahman, "can any of us now play at them, for they are not like our modern cards at all." Neither, indeed, do they bear any remarkable resemblance to our own—the pack consisting of no less than eight suits of divers colors, the kings being mounted upon elephants, and the viziers, or second honors, upon horses, tigers, and bulls. Moreover, there are other marks by which the respective value of the common C. may be distinguished, which would puzzle our club quidnuncs not a little—such as "a pine-apple in a shallow cup," and "a something like a parasol without a handle, and with two broken ribs sticking through the top." In the Chinese dictionary, called *Ching-tsze-tung*, it is asserted that dotted C. were invented in the reign of Seun-ho (1120 A. D.), and devised for the amusement of his numerous wives: there are thirty C. in each of these packs, three suits of nine C. each, and three single C. superior to all the others. The name of one of the suits is *Kew-ko-wan*—that is to say the nine ten-thousands of kwan, strings of beads, shells, or money; and the titles of the other two suits are equally concise and significant. The Chinese C. have, however, a decided advantage over those of Hindustan in being oblong instead of circular.

C. do not appear to have been known in Europe until towards the end of the 14th century. "In the year 1379," writes Carelluyzo, "was brought into Viterbo the game at cards, which comes from the country of the Saracens, and is with them called *naib*." "Whence afterwards," says Mr. W. Chatto ("Origin and History of Playing Cards," Lond. 1848), "perhaps Jackannpes, Jack of cards." This entry occurs in the accounts of the treasurer of Charles VI. of France, in 1392: "Given to Jacquemin Gringonneaur, painter, for three packs of cards, gilt and colored, and variously ornamented for the amusement of the king, fifty-six sols of Paris." From the date of this year being immediately subsequent to that in which the king lost his reason, the story goes that C. were invented to divert his royal melancholy; but they were certainly of earlier use in France. The French clergy took greatly to C. about this time; we are afraid, too, it was to the ungenteel game of All-fours, since we find them specially forbidden that amusement by the synod of Langres, in 1404.

Card-making became a regular trade in Germany fourteen years after this, and it, as well as card-painting, seems to have been carried on for some time exclusively by females; the wood-engraving of C., however, did not begin until some time afterwards. The pips were then very prettily imagined, the suits consisting of hearts, bells, acorns and leaves. The place of her majesty the queen was filled by a knight in those days; and it is to Italy, and not to Germany or France, that the glory of giving *places aux dames* must be conceded. There was also no ace whatever! By 1490, gambling by means of C. had grown to such a pitch, as to provoke St. Bernardin to preach against it at Bologna; and that so eloquently, as to cause his hearers to make a fire in the public Place, and throw all the C. in their possession into it—a proceeding which must have been hailed with joy by the Messrs. De la Rue of that period. The signs upon Italian C., which seem to have been the first imported into England, were cups, swords, money, and clubs; but in the third year of Edward IV., their further importation was forbidden, and the home-trade of card-making protected. C. were played by that time, we read, "in all places of worship" in this country, by which it was meant, not in the churches, but in the houses of all the gentry. Henry VII. was a card-player, and there are not a few entries in that mean monarch's privy-purse account of his majesty's little losings. His daughter Margaret, at the age of fourteen, was found by James IV. of Scotland—the first time he ever saw her—in the act of playing cards; and it was most probably *écarté*, for he at once "proposed" to her, and she "accepted" him. There was a sum regu-

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ary allotted to the Princess, afterward, Queen, Mary, as pocket-money for this especial purpose; the sums given her at a time for immediate disbursement ranging from 20s. to 40s., but one entry being so disgracefully low (for a princess) as "two and tuppence." James I. likewise played a good deal, but so sleepily, that he required somebody to hold his C. for him.

About the year 1660, heraldic C. were first introduced into England, the King of Clubs being represented by the arms of the pope; of Spades, by those of the king of France; of Diamonds, by those of the king of Spain; and of Hearts, by those of the King of England. From these heraldic C., we suppose, Mr Chatto derives the word coat-card, instead of court-card, which is certainly in more general use. In 1679, a pack was published containing the history of all the popish plots, "excellently engraved on copper-plates, with very large descriptions under each card. Aspersers of this pack," it is added by their disinterested publisher, "plainly shew themselves to be popishly affected."

The French, from whom we derive our ordinary suits of diamond, heart, spade, and club—*carreau*, *cœur*, *pique*, and *trèfle*—were continually changing their court-cards, and representing on them all sorts of historical characters. In the earlier periods, their kings were David, Alexander, Cæsar, and Charlemagne, or Solomon, Augustus, Clovis, and Constantine; about all of whom, as well as their queens, Père Daniel has the most ingenious theories. Troops, says he, however brave and numerous, require to have prudent and experienced generals. The *trèfle* or clover-plant, which abounds in the meadows of France, denotes that a chief ought always to encamp his army in a place where he may obtain forage for his cavalry; *piques* and *carreaux* signify magazines of arms, which ought ever to be well stored—the *carreau* being a sort of heavy arrow shot from a cross-bow, and which was so called from its head being squared (*carré*); *cœurs*, hearts, signified courage of both commanders and soldiers; the *as* was the Latin *as*, and represented money, the sinews of war; and so on.

At the time of the French Revolution, the places of the card-kings were filled by four philosophers—Molière, Lafontaine, Voltaire, and Rousseau; and those of the queens by four virtues—Prudence, Justice, Temperance, and Fortitude.

Many attempts have been made to put down card-playing by the strong hand of the law; but the history of the Four Kings has, nevertheless, always retained its students. Not a few enthusiastic players have absolutely died in harness, with cards in their hands, such as the great Bath player Lookup, who expired at his favorite "Double Dumby," not even being permitted by inexorable Death to play out the game. The Four Kings, like their flesh-and-blood originals, are likely to lose all sway over the New World; for Mr. Chatto informs us, that the court-cards, if they can be called so, of a republican pack manufactured in 1848 at New York, have neither kings nor queens; the President of Hearts being Washington; of Diamonds, John Adams; of Clubs, Franklin; and of Spades, Lafayette. One of the queens is Venus, modestly concealing her charms; and the others are respectfully Fortune, Ceres, and Minerva; while the knaves are fitly represented by Indian chiefs.

The manufacture of playing-cards comprises many interesting processes. The cardboard employed for this purpose is formed of several thicknesses of paper pasted together; there are usually four such thicknesses: and the paper so selected as to take paste, paint, and polish equally well. The sheets of paper are pasted with a brush, and are united by successive processes of cold-drying, hot-drying, and hydraulic pressure. Each sheet is large enough for forty cards. The outer surfaces of the outer sheets are prepared with a kind of flinty coating, which gives sharpness to the outline of the various colored devices. Most packs of cards are now made with colored backs. The ground-tint is laid on with a brush, and consists of distemper color, or pigments mixed with warm melted size. The device impressed on this ground-tint is often very beautiful. Messrs De la Rue, the leading firm in the manufacture, employ tasteful artists, and invest a large amount of capital, in the introduction of new patterns. On cards sold at moderate prices, the colors at the back are generally two—one for the ground, and one for the device; but some of the choicer specimens display several colors; and many of the designs are due to the pencil of Mr Owen Jones. The printing of the design is done on the sheets of paper, before the pasting to form cardboard. The pips or spots on the faces of playing-cards are now

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spades, *clubs*, *hearts*, and *diamonds*; but at different times, and in different countries, there have been leaves, acorns, bells, cups, swords, fruit, heads, parasols, and other objects similarly represented. In English cards, the colors are red and black; Messrs De la Rue once introduced red, black, green, and blue for the four suits; but the novelty was not encouraged by card-players. The same makers have also endeavored to supersede the clumsy devices of kings, queens, and knaves, by something more artistic; but this, too, failed commercially; for the old patterns, like the old willow-pattern dinner-plates, are still preferred—simply because the users have become accustomed to them. Until within the last few years, the printing of cards was generally done by *stencilling*, the color being applied through perforated devices in a stencil-plate. The color employed for this purpose is mixed up with a kind of paste. When there is a device at the back, the outline of the device is printed from an engraved wood-block, and the rest filled in by stencilling. The stencilling of the front and back can be done either before or after the pasting of the sheets into cardboard. One great improvement in the manufacture has been the substitution of oil color for paste or size color; and another, the substitution of printing for stencilling. Messrs De la Rue have expended large sums of money on these novelties; for many experiments had to be made, to determine how best to employ oil color so that the spots or pips may be equal-tinted, the outline clear and sharp, the pigment well adherent to the surface, and the drying such as to admit of polishing without stickiness. The plates for printing are engraved on copper or brass, or are produced by electrotype, or are built up with small pieces of metal or interlaced wire. The printing is done in the usual way of color-printing, with as many plates as there are colors (usually five), and one for the outlines; it is executed on the sheets of paper, before being pasted into cardboard. When the printing, drying, and pasting are all completed, a careful polishing is effected by means of brush-wheels, pasteboard wheels, heated plates, and heated rollers; in such a way that the polish on the back may differ from that on the face—since it is found that two equally polished surfaces do not slide quite so readily over each other. Every pack of cards made in England for home-use pays a duty of threepence, which duty is levied on the ace of spades. The makers of cards pay £1 per annum for a licence, and formerly the venders had to pay 2*s.* 6*d.* per annum, but this latter tax was repealed on the 5th July 1870. The cardboard, when all the printing is finished, is cut up into cards; every card is minutely examined, and placed among the "Moguls," "Harrys," or "Highlanders," as they are technically called, according to the degree in which they may be faultless or slightly specked; and the cards are finally made up into packs. Persons wishing the best cards should ask for "Moguls," the usual retail price for a pack of which is 2*s.* 3*d.* to 3*s.* 9*d.*

A few years ago, it was estimated that about half a million packs of cards are made annually in England, by about seven or eight firms. Card-playing is not now so general in England as it was early in the century, and the number made has consequently lessened, although the quality has greatly improved. All the cards used in Russia, with a few exceptions, are made at an imperial manufactory in St Petersburg, where the operations are conducted on a large scale, and where the number of packs made exceeds manifold the whole produce of England. The French cards are somewhat smaller and thinner than those of England.

CARDUE'LIS. See GOLDFINCH.

CA'RDUUS. See THISTLE.

CARE or Carle Sunday, the Sunday before Palm Sunday, said to be so called because it was the practice in many parts of the country to eat gray peas, called carlings, fried in butter, pepper, and salt, on this day. This practice apparently had its more immediate origin in the custom of the Roman Catholic Church of eating hallowed beans fried at this time—these beans being described in some religious books as symbolical of confession, and their steeping before use, of meditation. It appears, however, to have been adopted by this church from a heathen custom. See Brand's "Popular Antiquities."

CAREE'NING is the operation of heaving down a ship on one side, in order to expose the other side for cleaning by the process of *Breaming* (q. v.). C. is seldom now performed upon English ships, partly because the use of copper-sheathing les-

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sens the fouling of the bottom, and partly because caissons and hydraulic lifts afford means for raising ships out of the water. The *Great Eastern*, in 1860, was placed upon an open scaffolding or frame, called a *gridiron*, in Milford Haven, and floated so as to render cleansing possible without the dangerous and difficult process of careening.

In sea-phrase, a vessel is said to "careen" when she leans over very much through press of sail.

CA'RET (from the Latin *careo*, I am wanting), a character of this form, ⋀, denoting that something has been omitted, and is interlined.

CAREW, Thomas, a poet of the reign of Charles I., descended from an old family in Gloucestershire, was born 1589. Having been educated at Oxford, he travelled abroad for some time, and on his return was received at court, and patronised by Charles I. C. deserves mention chiefly as the precursor and representative of what may be called the courtier and conventional school of poetry, whose chief characteristic was scholarly ease and elegance, with a spice of indelicacy, and even indecency. C.'s poems, mostly lyrical, and treating of trifling subjects, are among the best of their kind, and exhibit much fancy and tenderness. He died 1630. Several editions of his poems, which first appeared in 1640, have been published.

CA'REX, a genus of plants of the natural order *Cyperaceæ*, of which the species are very numerous—more than 450—principally abounding in the temperate and colder parts of the world. More than 60 are natives of Britain. The English name SEDGE or SEG is sometimes employed as synonymous with C., but is popularly applied only to some of the species. This genus is distinguished by unisexual flowers, the male flowers with one glume, the female enclosed in a flask-shaped involucre. Some of the species are plants of the very humblest growth, others are two or three feet in height; all are of unpretending, grassy, or rush-like appearance. Some grow in wet, and others in dry situations; some are of great value in the economy of nature, as forming the principal part of the vegetation of swamps, which they gradually convert into fertile ground. The running roots, or rather *rhizomes*, of some help to bind the sands of sea-shores, particularly *C. arenaria*, which is carefully planted for this purpose on the dikes of Holland. None are valued by the agriculturists, as they are very deficient in nutritive quality, and in general they abound only in very inferior pastures, and good tillage and drainage lead to their speedy disappearance. The rizomes of *C. arinaria*, *C. hirta*, and *C. disticha*, are sometimes used under the name of *German Sarsaparilla*, as a diaphoretic and demulcent medicine—a bad substitute for sarsaparilla. The two former are common in Britain. The dried leaves of *C. sylvatica* are used by the Laplanders to cover their legs and hands as a protection from frost-biting and chilblains, being worn in the inside of their shoes and gloves.

CAREY, William, D.D., a distinguished minister and missionary belonging to the Baptist body, was born at Paulersbury, a village in Northamptonshire, August 1761. He served his time as a shoemaker, but began to preach about his 20th year. A pamphlet which he published about this time, attracted the attention of his co-workers in the ministry to the subject of Foreign Missions, and ultimately a missionary society, chiefly through C.'s exertions, was formed. C. and a Mr Thomas were chosen its first missionaries to India in 1793. From that time until his death in 1836, C. was indefatigable (under many difficulties, especially in his early years) in his efforts to spread the the knowledge of the gospel among the heathen. Under his direction, the Serampore mission, of which he was the principal founder, had up to 1832 issued above 200,000 Bibles, or portions thereof, in about forty Oriental languages or dialects, besides a great number of tracts and other religious works in various languages. A great proportion of the actual literary labor involved in these undertakings was performed by C. himself, whose Sanscrit and other grammars have been highly spoken of by the late Mr Wilson Boden, professor of Sanscrit at Oxford. C. was professor of Oriental Languages at Fort-William College, Calcutta, from 1800 to 1830.

CAREY, Henry C., a political economist of the United States, born at Philadelphia in 1796. In 1836, he published an essay on the "Rate of Wages," which was expanded into the "Principles of Political Economy" (1837—1840). The value of this

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work may be estimated from the fact, that no less an authority than Frederick Bastiat copied its leading ideas. It was translated into Italian and Swedish, and favorably noticed in all the important politico-economic journals of Europe. In 1838, C. published "The Credit System of France, Great Britain, and the United States; and in 1848," "The Past, the Present, and the Future," a work marked by great vigor and originality. In 1853 appeared the "Letters on the International Copyright;" in 1858, "Principles of Social Science;" in 1867, "Review of the Decade" 1857—67; and, in 1873, "The Unity of Law." C. was originally a free trader, but was ere long recognized as the head of a new school of political economy. According to this system free trade may be the ideal towards which we should tend, but a period of protection is an indispensable stage in the progress toward it.

CA'RGO is a general name for all the merchandise carried on board a trading-ship. Sometimes it is applied also to the invoice of the cargo. The term *deck-cargo*, is given to the commodities on deck, which are not usually included in the policy of insurance.

For the security of the Customs' revenue, the master of every coasting-vessel is bound to keep a *cargo-book*, recording the name of the vessel, the name of the owner, the port of departure, the port of destination, the goods taken, the names of the shippers and consignees, the time of departure, and other particulars. The Custom-house officers may demand to see this book at any time. The C. of passenger-ships is placed, in some degree, under the control of the emigration officers by an act passed in 1852.

CA'RIA, in ancient geography, the south-westernmost country of Asia Minor, bounded n. by Lydia, e. by Phrygia, s, e. by Lycia, and w. and s. w. by the Mediterranean. A large portion of what was C. is mountainous. The chief ranges were called the Cadmian and the Latmian. The most important river was the *Mæander*, famous for its windings. C. was, at an early date, governed by petty princes or kings; it afterwards became a part of the Persian empire, the former princes continuing to rule as satraps; and it subsequently came into the hands of the early Macedonian kings of Egypt; and finally, with the rest of Asia, into those of the Romans. Among the chief towns were Cnidus, Halicarnassus, and Miletus.

CARIA'CO, a seaport of Venezuela, at the mouth of a river, and at the head of a gulf of the same name. It is 40 miles to the east of Cumana, in lat. 10° 30' n., and long. 63° 40' w. Pop. 7000. The gulf, long and narrow, with good anchorage, and well-wooded shores, is open only on the west, and that to a portion of the Caribbean Sea, which is itself breasted by a chain of islands.

CA'RIACOU, Ca'rjacou, or Virgi'nian Deer (*Cervus Virginianus*), a species of deer found in all parts of North America, from Mexico to about n. lat. 48°, and from the Atlantic to the Pacific Ocean. It is the species commonly called Deer by the Anglo-Americans. It is smaller and more elegant than the common stag; of very variable color—light reddish brown in spring, slaty blue in autumn, and dull brown in winter; the belly, throat, chin, and inner parts of the limbs white. The horns of the adult male are of moderate size, bent strongly backward, and then suddenly forward, so as to bring their tips nearly above the nose; they have several snags. The fawn is profusely decked with white spots, arranged in lines, and sometimes running into stripes. The name C. is extended generically to several nearly allied species, found in Mexico, California, &c.

CARIA'MA (*Microdactylus cristatus*), a bird of the order *Grallæ*, allied to the cranes, but exhibiting also points of strong resemblance to gallinaceous birds, among which it has therefore been proposed to rank it, next to the guans. It is a native of Guiana, Brazil, and Paraguay, inhabiting open plains and the outskirts of forests, where it feeds chiefly on serpents, lizards, and insects. It is larger than the common heron; the plumage is brown, finely waved with darker brown, whitish on the lower parts. When pursued, the C. seeks safety by running, and does not readily attempt to use its wings. Its voice resembles that of a young turkey. It is much esteemed for the table, and is sometimes reared in a domesticated state.

CARIBBE'AN SEA, the grandest inlet of the western hemisphere—corresponding, in several respects, to the Mediterranean in the eastern—is separated from the Gulf of Mexico by Yucatan, and from the Atlantic Ocean by the great arch of the

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Antilles, between Cuba and Trinidad inclusive, stretching in n. lat. from about 8° to about 22°, and in w. long. from about 61° to about 89°. The C. S. forms the turning-point in the vast cycle of waters known as the GULF STREAM (q. v.), that wheels round, with the regularity of time itself, from Southern Africa to Northern Europe. It pours its waters into the Gulf of Mexico on the west, which shoots forth, on the east, the Florida stream with the computed volume of 3000 Mississippis. To supply this enormous efflux, the C. S. draws on the Atlantic, laying under contribution nearly all the trade-wind regions of that ocean, so as literally to become the receptacle of the Amazon and the Orinoco. To the British Isles, it is, in this connection, an object of peculiar interest. Rendering still warmer the warm floods which it concentrates, it it imparts to the Florida Stream that high temperature which tends, with the aid of the prevalent winds, to mitigate climate from Guernsey to Shetland. In common with the islands of its eastern boundary, the C. S. takes its name from their now extinct aborigines, the Caribs.

CARIBBEE BARK or Piton Bark, is the bark of *Exostemma Caribæum*, a small tree which grows in the West Indies and in Mexico, and belongs to the natural order *Cinchonaceæ*. The genus *Exostemma* is very nearly allied to *Cinchona*, from which it differs in having the stamens exserted, whereas in *Cinchona* they are included within the corolla. *E. Caribæum* has ovate lanceolate leaves, and is known in the West Indies as the *Sea-side Beech*. C. B. has a very bitter taste, and a very faint smell. It contains none of the characteristic alkaloids of cinchona, yet very much resembles it in some of its properties, and is one of the barks sometimes substituted for the true cinchona barks.

CARICA. See PAPAW.

CARICATURE (Ital. *caricatura*, from *caricare*, to load or overcharge). The etymology of this word indicates its meaning very distinctly, which is that of a representation of a face, form, or character, in which the salient features are exaggerated or overloaded to the extent of producing a ludicrous effect, without entirely, or even essentially destroying the resemblance. C. may be regarded as the opposite of idealisation; the former consisting in a disproportionate development of some, very frequently of one only, of the characteristics of the subject treated, the latter in a proportionate elevation of them all. Nay, further, the destruction of harmony is essential to C., and where harmony is the prevailing quality of its subject, the required effect may frequently be produced by this means alone; whereas harmony belongs of necessity to idealisation, and where its absence was the characteristic defect of the object as a real existence, an ideal of a humble kind may frequently be produced by simply restoring it.

When used with reference to sensible representation, C. stands, to the genuine productions of the plastic and pictorial arts, in the same relation in which farce stands to the legitimate drama. Both C. and farce are thus degenerate forms of art; and though requiring much cleverness for their successful execution, and often affording lively satisfaction to the spectator, can scarcely be said in general to have an elevating object, or any other tendency than to amuse. When used as ancillary to well-directed and merited satire, C. assumes a nobler character, and it is to the credit of our nation that it is so frequently thus employed in our ephemeral literature. The best examples of C. which have ever appeared in the literature of any people, are to be found in the pages of "Punch."

CARIES (*rottenness*) is a disease of bone analogous to the ulceration of soft tissues. It is characterised by a gradual loss of substance, from the particles of bone being absorbed, or being cast off and washed away in a purulent discharge. It begins as an unhealthy inflammation, followed by exudation of new materials, and softening of the part affected. On examination, the bone-cells are found filled with a reddish glairy fluid, and in scrofulous patients, deposits of tubercle. After C. has existed for some time, an abscess forms, and bursts; its aperture remains open, discharging a thin fluid, which contains particles of the bone. If a probe be passed through this opening, it will be felt to sink into some soft gritty substance; this is the carious bone, which if removed, and well washed, will be found to resemble in whiteness and fragility loaf-sugar softening in hot water.

C. may attack any bone, but it usually selects the veterbræ, those of the wrist and

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foot, and the soft ends of long bones forming joints. To this terrible disease most deformities, not congenital, are owing. The carious vertebræ yield under the weight of the trunk, and the spine curves forwards, or to one side. In the joint-ends of bones, the part enlarges, the cartilages become affected, matter forms, and amputation of the limb, or excision of the joint, is frequently necessary to save the patient's life. Too often the disease recurs with night-sweats, hectic, and death.

The causes of C. are constitutional, though it may be accidentally determined to some particular part of the body by any irritation, such as a blow, or exposure to atmospheric changes. Scrofulous persons, and those who have had syphilis or mercury in excess at any period of their lives, are more subject to it than others. If affecting a small bone, the latter may be entirely removed; and if the disease is strictly limited to the ends of bones forming a joint, these may be excised. Within the last thirty years great advances have been made in this department of surgery, and C. of the joints is but seldom counted a sufficient reason for amputation; the knee, hip, shoulder, elbow, ankle, and wrist joints have all been repeatedly excised successfully in this country. In situations where the part cannot be reached by instruments, lotions of dilute acid may be injected, with the view of stimulating the carious surface to assume a healing action.

The treatment of C. consists in supporting the patient's strength by judicious change of air, and tonics, with the administration of medicines, such as cod-liver oil in scrofula, which appear to combat the constitutional predisposition to the disease. In those parts where the diseased bone can be reached, it should be gouged or scraped away, so as to leave a healthy surface of bone, which may granulate up, and heal.

CARIES OF THE TEETH depends, it is supposed, on an original faulty formation of their substance, when, after any depressing cause, especially in scrofulous and ill-nourished persons, they soften and crumble away, at last laying open the cavity which contains the nervous pulp of the tooth, and producing toothache. *Treatment.*—The carious surface should be removed, and, as a substitute for the lost substance, gold or some other substance should be stuffed into the cavity. If the pulp be exposed, the hole should be stuffed with some softer material, till the parts are somewhat hardened; for this, Mr Tomes of London recommends a plug of cotton-wool dipped in a mixture of mastich, a drachm, and rectified spirit or Eau-de-Cologne, an ounce and a half; or of gutta-percha dissolved in chloroform.

CARIGNA'NO, a town of Piedmont, in the province of Turin, about 11 miles south of the city of that name. It is situated near the left bank of the Po, in the midst of a most beautiful country; has some fine churches, manufactures of silk-twist, and a population of 7712. This town gives name to a branch of the House of Savoy.

CA'RILLON. See BELL.

CARIMA'TA, a name applied to the passage between Borneo and Billiton; also to a cluster of islets in the same passage; and lastly, to the principal member of the group, whose highest point, a peak of 2000 feet, is in lat. 1° 36′ s., and long. 108° 54′ e.

CARINA'RIA, a remarkable and interesting genus of gasteropodous mollusks, of the order called *Heteropoda*, or *Nucleobranchiata*, having a thin shell, in form somewhat like that of a limpet, which, however, only covers the visceral sac (heart, gills, &c.), leaving the greater part of the animal exposed. The shells of some of the species have been sometimes denominated *Venus's Slipper* and *Glass Nautilus*. The body is gelatinous, and so transparent that much of its interior organisation can be seen. Nearly opposite to the part of the back occupied by the shell is a sort of vertical fin, answering to the foot of the other gasteropods. The species of C. are all marine, are found only in the seas of the warmer latitudes, and generally swim with the back downward. Closely allied to C. is the genus *Firola*, in which there is no shell at all.

CARI NI, a town of Sicily, in the province of Palermo, and 12 miles west-north-west of the city of that name. It has an old castle; and a population of 9600, chiefly engaged in fishing.

CARINO'LA, a town of South Italy, in the province of Caserta, 20 miles south-

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east of Gaeta. It has a cathedral, and a Franciscan convent. The district produces excellent wine. Pop. 6620.

CARINTHIA (Ger. *Kärnthen*), a crown-land of the Austrian empire, forming part of the old kingdom of Illyria, with an area of 3958 square miles, and a population, in 1869, of 337,694, which is rather less than what it was in 1854. The principal river is the Drave, which passes through the country from west to east, in a course of almost 150 miles. The general aspect of the country is mountainous, with long deep valleys, that of the Drave widening at Villach and Klagenfurt into a great plain. The valley of the Drave divides the *Noric* from the *Carinthian Alps*. Agriculture is carried on to a limited extent, owing to the mountainous character of the country, great part of which is occupied in pasture, or covered with brush-wood. Many horses and cattle are reared and exported. The principal products are mineral. One of the principal branches of industry is the manufacture of hardware; the other manufactures include woollens, silk stuffs, and cottons. The capital is Klagenfurt.—The ancient inhabitants were the *Carni*, who derived their name from the Celtic word *carn* or *corn*, Lat. *cornu*, Eng. *horn*—an allusion to the craggy, horn-like pinnacles of their hills. Before the time of Augustus, it belonged to Noricum, afterwards to the Roman empire. By and by the Carni were swept away in the deluge of immigration from the east, and Slaves settled in the country. After some time the Slaves themselves were so heavily oppressed by the Avari, that they called to their assistance a Frank, named Samo, who founded the kingdom of Carantania, which included much more than the present C., but fell to pieces after his death. Finally it came into the possession of Austria (q. v.). Only about two-sevenths of the present population is Slavic (Slovenians), the remainder being Germans.

CARI'PE, a town of Venezuela, South America, situated in a fertile valley of the same name, 50 miles south-east of Cumana. The valley is noted for a cavern frequented by the remarkable bird, called Guacharo (q. v.). Pop. of town and valley, 5000.

CARI'SSA a genus of plants of the natural order *Apocynaceæ*. *C. Carandas* is a thorny shrub, much used for fences in India; and the fruit, called carandas—a berry about the size of a small plum—for tarts and preserves.

CARLEN, Emilie, a well-known Swedish novel-writer, was born 8th August 1807 at Strömstad, near the frontier of Norway. She was the youngest of 14 children of a merchant named Smith. During childhood her talent in imaginative fiction was remarked by her friends; but it was not till 1838 that her first novel, "Waldemar Klein," was given to the world. She was then a widow, having been married, in 1827, to Dr Flygare. In 1841, she was again married to J. G. Carlen, a lawyer, and known as a poet, in Stockholm. Her literary productiveness has been very remarkable, her fictions being chiefly founded on the characteristics of the lower orders in Sweden; and, although faulty in many respects, they are especially rich and striking in incident; and her characters, without exhibiting any very deep insight or subtle analytic power, are yet intelligible and consistent. Among her many works, which have been translated into English, are "The Rose of Thistleland," "The Birthright," "The Hermit," "The Events of a Year," "The Lover's Stratagem," "Gustavus Lindurm," "The Maiden's Tower," "Woman's Life," &c. Her works are largely circulated both in Europe and in America.

CARLETON, William, one of the most popular writers of tales describing Irish life and manners, was born, 1798, at Prillisk, in the county of Tyrone, Ireland. Bred and educated among the peasantry, he passed through the common sufferings and privations of Irish poverty, and, after receiving some scanty instruction in a hedge-school, he, in his 17th year, went to an academy which a relative had opened at Glasslough where he remained two years. Afterwards, a vague ambition led him to Dublin, where he arrived with only some three shillings in his pocket, and where, in 1830, he published his "Traits and Stories of the Irish Peasantry." Their freshness of style pleased the public, and won the favor of critics. A second series, issued in 1832, was also well received; and, in 1839, he published a powerful story, entitled "Fardorougha the Miser," in several passages of which, however, his humor becomes extravagant. Subsequently, C. published a series of tales (3 vols., Dub. 1841), mostly of pathetic interest, but including a very genial and humorous

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sketch of the "Misfortunes of Barney Branagan," which proved a great favorite. The story of "Valentine M'Clutchy" is half-political and half-religious in its tendency, defending the Irish Catholic priesthood, and advocating repeal of the Union; it appeared in 1845. Other narratives—"Rody the Rover," 1846; "The Black Prophet," 1847; and "The Tithe Proctor," 1849—contain many proofs of the author's genius. "Willey Reilley," 3 vols., appeared in 1855, and "The Evil Eye" in 1860. C. is the true historian of the Irish people. Sharing in their qualities of mind and temperament, he has a true sympathy with all their joys and sorrows, and a graphic and picturesque pen with which to describe them. In consideration of his literary services, he enjoyed a government pension of £200 a year and on his death in January 1869, the queen granted a pension of £100 to his widow.

CARLI, Giovanni Rinaldo, a distinguished Italian economist and archæologist, was born at Capo d'Istria, April 1720. Educated at home and at Flambro in the Friuli, he was, in his 24th year, appointed professor of astronomy and navigation at Padua. In 1754, he published the first volume of his great work "On the History of the Coins and Currency, and on the Institution of the Mints of Italy," the fourth and last volume of which appeared six years later. The book treats of the monetary history of Italy from the fall of the Western Empire until the 17th c., and is profusely illustrated with representations of coins, national and foreign, circulating in Italy during the various ages; and their value as compared with the price of provisions at different periods is also calculated. His merits as a financier were not overlooked. He was made President of the Council of Commerce and Public Economy at Milan, and afterwards President of the New Council of Finances, into which branch of administration he introduced many admirable reforms. The inhabitants were also indebted to his influence for the abolition of the Inquisitional Tribunal. He also wrote some valuable works on Istrian and other antiquities; dissertations on classical subjects; against sorcery; against Rousseau's theory of natural religion, etc. He died February 1795. His works, exclusive of his "Italian Antiquities," were published in 19 vols. 8vo. (Milan, 1784—1795).

CA'RLINE THI'STLE (*Carli'na*), a genus of plants of the natural order *Compositæ*, closely allied to the true Thistles, from which they are distinguished by the inner scales of the involucre spreading like rays, and being colored and shining. These involucral scales are remarkably hygrometric, expanding in dry and closing together in wet weather, and this property they retain for a long time; the heads of flowers are therefore often nailed on cottage-doors in many parts of Europe, to indicate the weather. The name C. T. is derived from a legend, that an angel shewed the root of one of the species to Charlemagne as a remedy for a plague. This species, *C. acaulis*, grows on hills and mountains, especially in calcareous soils in the middle latitudes of Europe. It has a very short stem, and very large heads of flowers, and was formerly in high repute for the medicinal virtues of its root—which is in large doses a drastic purgative—but its use is now almost confined to veterinary practice.—The only British species is the common C. T. (*C. vulgaris*), not unfrequent in England and some parts of Scotland, and sometimes a rather troublesome weed, but always indicative of a poor soil. It has a stem about a foot high; and many purplish heads of flowers set amidst straw-colored rays.

CA'RLINGS, in ship-building, are small beams laid fore and aft, and resting upon the main or deck beams. These with other pieces called *ledges* laid at right angles to them, form a framework by which the deck is supported.

CA'RLISLE, a parliamentary and municipal borough, episcopal city, and ancient town in North Cumberland, the capital of the county, 12 miles east of the Solway Firth, 300 miles north-west-by-north of London, 101 miles south of Edinburgh, and 60 west-south-west of Newcastle. It is a chief station on the west railway route from London to Edinburgh, and is the terminus of seven different lines of railway. It stands on an eminence in a wide plain at the confluence of, and nearly surrounded by, the Eden, Caldew, and Peteril. Many fine new streets and buildings have been lately added to the city. The chief branches of industry are cotton, gingham, and check manufactures; print, iron, and dye works; and salmon-fisheries. It has a small cathedral of red freestone, of which Paley was archdeacon. The castle was founded in 1092, and is now a barracks; the remains of the keep form a massive lofty tower, with a very deep well. Mary Queen of Scots was confined in

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the castle after the battle of Langside. A canal of 11 miles, from Bowness on the Solway Firth to C., formerly admitted vessels of 100 tons; but the bed of the canal has now been converted into a railway, from which a line also branches to the newly formed port of Silloth, where an extensive dock has been constructed on the Solway, at a distance of 20 miles from Carlisle. Pop. in 1763, 4000; 1801, 10,221; 1851, 26,310; 1861, 29,417; 1871, 31,049. C. returns two members to parliament. The total number of vessels that entered the port of C. in 1876 was 568, of 109,905 tons; cleared 695, of 123,305 tons. Roman remains have been found here—coins, altars, inscriptions, brass incense vases, &c. Being near the west end of Hadrian's Wall, C. was probably a Roman station. It was the seat of the ancient kings of Cumbria. The Picts and Scots ravaged it. About 900 it was destroyed by the Danes, after which it remained desolate for 200 years. Thence to the union of England and Scotland, it was closely connected with the border wars, and underwent many sieges. To its being long a fortified border town it owed much of its importance and privileges, but it declined much after the union. The C. corporation, in 1745, proclaimed Prince Charles king of Great Britain. The Duke of Cumberland afterwards took the city, and punished the chief actors with death, and the inhabitants with other cruelties. In 1133, Henry I. made C. a bishopric.—The C. Tables of Mortality, based on the deaths which occurred in C. 1779—1787, were drawn up by Dr Heysham, and have been ever since much used by life-insurance offices, as being nearest the average.

CARLISLE CATHEDRAL was commenced about 1092 by Walter, a Norman. It was founded by William Rufus, and dedicated in 1101 by Henry I.; and in 1133, was made the cathedral church of the newly formed diocese. A great part of the original Norman building was destroyed by fire in 1292. The new edifice contains specimens of all the styles of early English—simple pointed, geometric, and flowing. Two-thirds of the fine Norman nave, originally 141 feet long, were destroyed by Cromwell; the portion that was left has long been used as a parish church. In 1853, the restoration was commenced. The choir is one of the finest in England, 138 feet long, and 72 high, and consists of eight pointed arches. The east window, consisting of 9 lights, is considered the finest decorated window in England. The tower is very low, rising but one story above the choir. It formerly supported a timber spire, which was removed in 1661. This cathedral has four canons.

CARLI'SLE, the capital of Cumberland county, Pennsylvania, U. S., 18 miles south by west of Harrisburg, the centre of a rich agricultural country; seat of Dickinson College, a flourishing Methodist institution; with 13 churches, 2 banks, 2 newspapers, machine shops, rail-car factory, and United States barracks; was shelled by the Confederates, July 1, 1863. Pop. (1880) 6,209.

CARLISLE, George William Frederick Howard, Earl of, K. G., was born April 18, 1802. Educated at Eton and Oxford, he, in 1821, obtained the Chancellor and Newdegate prizes for his Latin and English poems. He entered the public service in 1826 as an attaché. In 1830, he (then Lord Morpeth), along with Henry (afterwards Lord) Brougham, was elected one of the representatives of the important constituency of Yorkshire, and after the Reform Bill for the West Riding, a position which he held in the liberal interest for several years. Under the administration of Lord Melbourne, he held the office of chief secretary for Ireland (1835—1841), and his impartial distribution of patronage made him very popular in Dublin. Rejected in 1841 by the West Riding, he was again elected in 1846, and remained one of its representatives until the death of his father (1848) called him to the House of Lords. Under Lord John Russell's ministry (1846—1852), he was Chief Commissioner of Woods and Forests, and afterwards Chancellor of the Duchy of Lancaster. When Lord Palmerston was made prime minister in 1855, C. was appointed Lord Lieutenant of Ireland, a post which he held until the advent of the Earl of Derby's government in 1858; and he succeeded to the same office again when Lord Palmerston was reinstated in 1859. C. obtained some reputation as a literary man, chiefly by his lectures on his travels in the United States, on the life and writings of Pope, and his "Diary in Turkish and Greek Waters." He died in 1864.

CARLOS, Don, Infante of Spain, born July 8, 1545, at Valladolid, was the son of Philip II. After his recognition as heir to the throne, in 1560, Don C. was sent to study at the university of Alcala de Henares; where, however, he profited so lit-

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tle, that the king, regarding him as unqualified to reign, invited a nephew, the Archduke Rudolf, to Spain, intending to make him heir to the throne. Excluded from all participation in the government, Don C. conceived a strong aversion toward the king's confidants, and especially was unwilling that the Duke of Alva should have the government of Flanders.—In confession to a priest, on Christmas eve 1567, he betrayed his purpose to assassinate a certain person; and as the king was believed to be the intended victim, this confession was divulged. The papers of Don C. were seized, and being tried, he was found guilty of conspiring against the life of the king, and of traitorously endeavoring to raise an insurrection in Flanders. The sentence was left for the king to pronounce. Philip declared that he could make no exception in favor of such an unworthy son; but sentence of death was not formally recorded. Shortly afterwards, he died, July 24, 1568, and was interred in the Dominican monastery, El-Real, at Madrid. The suspicion that he was poisoned or strangled, has no valid evidence to support it. Schiller, in his tragedy, "Don Carlos," has widely departed from historical testimonies.

CARLOS DE BOURBON, Don Maria Isidor, born March 29, 1788, was the second son of Charles IV. of Spain, and was educated chiefly by priests. After the expulsion of the French from Spain, his brother, Ferdinand VII., reascended the throne; but having married thrice without issue, Don C. began to cherish the hope of succeeding his brother. An insurrection in his interest broke out in 1825, in Catalonia; but was put down, Don C. himself not participating in it. A fourth time, however, the indefatigable Ferdinand married, and the result was a daughter, the Infanta Maria Isabella (nte queen of Spain), born October 10, 1830. Now, as the Salique Law, excluding females from succession to the throne, had been abrogated, the hopes of the Carlists, as the followers of Don C. were called, were destroyed. During the illness of the king, in September 1832, the Carlists succeeded so far as to win from him a re-institution of the Salique Law; but he revoked it again as soon as he had partially recovered, and thus Don C. was again disappointed. As he still continued his agitation, he was banished, in 1833, to Portugal, and, soon afterwards, was commanded to reside in the Papal States. But before C. had embarked for Italy, King Ferdinand VII. died, September 29, 1833. Don C. was now recognized as heir to the throne of Spain, not only by the Carlists but also by Dom Miguel in Portugal; and having refused to obey the queen-regent's order for his deportation to Italy, he was declared a rebel, October 16, 1833. By the quadruple alliance of Spain, Portugal, England, and France, both C. and Dom Miguel were banished from Portugal, and in June 1834, the former embarked for England. In the following month, he returned to the continent, passed in disguise through France into Spain, where he excited an insurrection in the northern provinces, but was ultimately compelled to escape into France. In 1836, his claims to the throne were unanimously rejected by the Constituent Cortes. In 1844, he abdicated in favor of his eldest son; and died at Trieste, March 10, 1855.—Don Carlos, his son, born in 1818, was better known as the Count de Montemolin. This second pretender made an attempt, in 1849, to pass under disguise through France into Spain, but failed. In 1860, a Carlist insurrection was once more attempted, in consequence of which the Count de Montemolin and his brother were arrested, but liberated after the former had signed a renunciation of all his claims to the Spanish throne. He died in 1861. The present representative of his pretensions is his nephew, Don Carlos, son of his brother Juan, born 1848. On his behalf, Carlist risings—speedily repressed—took place in 1869, 1870, and 1872; but the insurrection headed by Don Carlos, after the abdication of King Amadeo in 1873, proved much more formidable, and kept the northern provinces of Spain in great confusion till the beginning of 1876, when it was crushed.

CA'RLOS, San, a town of Venezuela, South America, in a valley on the Aguare, a feeder of the Orinoco, 120 miles south-west of Caracas. Before the wars of independence it was a place of considerable importance, having been one of the richest towns in the province. The town is handsome and well laid out. The pop. was formerly 10,000, but is now considerably less. The inhabitants are engaged chiefly in the rearing of cattle, and the cultivation of indigo, cotton, and coffee, of which there are still considerable plantations in the neighboring savannahs.

CARLOVI'NGIANS, the second dynasty of Frankish kings. The origin of the

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family is traced to Arnulph, Bishop of Metz, who died in 681. His son, Anségise, married a daughter of Pepin, of Landen, in Austrasia. His sons, Martin and Pepin d'Heristall (q. v.), as the greatest territorial lords in Austrasia, were called to the office of Mayor of the Palace. Martin was assassinated; Pepin, by force of arms, compelled the weak Merovingian king, Theodoric III., to invest him with the office of Mayor of the Palace in all the three Frankish States, Neustria, Austrasia, and Burgundy. Pepin allowed the Merovingian kings to remain upon the throne, but they were kings only in name. He died on 17th December 714, and left as his successor his young grandson, Theodoald; but Charles Martel (q. v.), a natural son of Pepin, was made Mayor of the Palace by the Austrasians, and in this capacity subjected the three states to his power. He died in 741. His two sons, Carloman and Pepin le Bref, divided the kingdom, although for a time the nominal Merovingian dynasty still subsisted; but Pepin at last formally assumed the royal power, and was crowned King of the Franks on the 3d May 752. This is the formal commencement of the Carlovingian dynasty. Pepin began the conquest of Italy. His sons, Carloman and Charles the Great or Charlemagne (q. v.), succeeded him, of whom the latter soon reigned alone, and prodigiously extended his dominions. In 800, Pope Leo III. set upon his head the crown of the Western Roman Empire. He divided his dominions amongst his sons, of whom, however, only one, Louis le Débonnaire, survived him, who, in the list of the kings of France, appears as Louis I., but who was properly Emperor and King of the Franks. With Charlemagne, however, the high abilities of his family suddenly disappeared, and his successor shewed much weakness of character. Family feuds broke out during the life of Louis le Débonnaire, who had divided his dominions in part amongst his sons, and he terminated an inglorious reign in 840. By a treaty concluded in August 843, Lotharius I., the eldest son of Louis, obtained the imperial crown and the kingdom of Italy, with Lorraine, Franche Comté, Provence, and the Lyonnois; Louis, his brother, called Louis the German, obtained the German part of his father's dominions; and Charles the Bald, the son of a second marriage, obtained Neustria, Aquitania, and the *Spanish Mark*, and may almost be regarded as the founder of the French monarchy. The Emperor Lotharius I. died in 855, and his dominions were again divided—his eldest son, Louis II., being Emperor and King of Italy, and his two other sons kings of Lorraine and of Provence, but their kingdoms reverted to the Emperor.—Charles the Fat, a son of Louis the German, having become emperor, was elected by the French nobles to be their king in 882; and being previously in possession of Italy and Germany, united under his sway great part of Charlemagne's empire. But he was a weak monarch, and was deposed in 887. The imperial dignity passed by the marriage of the daughter of the Emperor Arnulph with Fritzlar, Count of Fronconia, to another family. The French dynasty, of which Charles the Bald may be deemed the founder, continued in a succession of weak monarchs for about a century, till it terminated with the reign of Louis V., on whose death, Hugh Capet, the most powerful nobleman in France, seized the crown in 987. The Carlovingian kings had for some time previous possessed no real power. A subsequent marriage, however, connected their family with that of the Capets, and enabled the kings of France to trace their descent from Charlemagne.

The Carlovingian dynasty figures in the early history of France as the ally of the church. It aided the popes against the Lombards; made war on the Aquitanians, who pillaged and despoiled the churches; established the temporal power of the successors of St Peter; subdued and converted the still pagan Saxons; and fought the Mohammedans in Spain. Nor, on the other hand, do we find the church ungrateful; it sanctioned, by benediction and prayer, the conquests of this powerful family; in various ways impressed its sacred stamp of approbation upon it; and for its sake resuscitated the imposing idea of an empire of the west. But this alliance, which was advantageous to the policy of kings like Pepin le Bref and his son Charlemagne, because they had genius, vigor, and design, became at a later period, under their feeble successors, a chief cause of the overthrow of the dynasty, for the clergy after 814 grew stronger and more exacting every day, and forced the monarchs to new concessions.

CA'RLOVITZ, or Karlovitz, a town of the Austrian empire, in the "king

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dom" or province of Slavonia. It is situated on the right bank of the Danube about 3 miles south-south-east of Peterwardein, and is noted for its excellent wine, and for the treaty concluded here in 1699. The wine—especially the red variety—ranks with the best and strongest obtained in Hungary, and in some years the product has amounted to about 1¼ million of gallons. Pop. (1869) 4419. The important treaty or pence of C. was concluded, in 1699, between the allies Austria, Russia, Poland, and Venice on one side, and the Porte on the other, and included the following articles: "That Austria should repossess the territories captured by the Turks during two centuries (which included Hungary and Slavonia, and she also acquired Transylvania); that Venice should hold the Morea as far as the isthmus; that Poland should take back Podolia and the lands in the Ukraine conquered by Mohammed IV., but should cede certain places in Moldavia; and that Russia should have the territory of Azof."

CA'RLOW, the capital town of Carlow county, Ireland, situated at the confluence of the Burren and the Barrow, 56 miles south-west of Dublin by rail. It is a well-built town, with two principal streets, from which branch many smaller ones, and a suburb, Graigue, in Queen's County, on the opposite side of the river, with which it is connected by a bridge. It has a Roman Catholic cathedral and divinity college. C. has extensive flour mills, and is the emporium for the agricultural produce of the district, largely exported from this place. Pop. (1871) 7842. It returns one member to parliament. There are here the remains of a castle, picturesquely situated on an eminence on the Barrow, founded in 1180 by Sir Hugh de Lacy. In 1361 the Duke of Clarence established the Exchequer of the kingdom in this place. It constituted one or the boundaries of the PALE, beyond which, the king's writ was not recognised by the "Irishry." Its first charter was granted in the 13th c. by William Marshall, Earl of Pembroke. The town grew up around this castle, which was several times besieged by, and alternately in the possession of, the English and Irish. The castle (one of great extent) was in the possession of the insurgents in 1650, when it was closely invested by General Ireton and the republican army. The garrison surrendered on conditions to Sir Hardress Waller, whom Ireton had left to conduct the siege. It was then dismantled; and about one-half of this once stately castle now remains a picturesque ruin. In the Irish insurrection of 1798, the insurgents attacked the town, but were repulsed by the garrison and yeomanry, and 600 of them killed. The Barrow is here navigable for small-craft to its junction with the Grand Canal at Athy.

CARLOW, a small inland county of Ireland, in Leinster province, with an area of about 346 square miles, of which $\frac{4}{5}$ths are arable. C., except in the southern extremity, where it is hilly, is a triangular fertile level, or gently undulating plain, between the Wicklow and Wexford range of hills on the east, and the highlands beyond the Barrow on the west. The chief rivers are the Barrow and Slaney. C. consists chiefly of granite, covered in the middle plain, or richer tracts, by limestone gravel, on which are fine loams and pasture. In the uplands, the soil is gravelly. Lower, carboniferous limestone crops out in the valley of the Barrow. On the west side of the county begins the great coal district of Leinster. In 1876, 79,345 acres were under crop, the chief crops being oats, potatoes, barley, and wheat. There are many dairies on the plains. The chief exports are corn, flour, meal, butter, &c. Along the Barrow, which falls above a foot per mile, are a great many extensive corn-mills. Pop. 1841, 86,228; 1851, 68,059; 1871, 51,472. It returns three members to parliament—two for the county at large, and one for the borough of Carlow. The chief towns are Carlow, Tullow, and Bagenalstown. At Old Leighlin a synod was held in 630, to settle the time of Easter. Several engagements occurred in the county during the Irish rebellion of 1798. The chief antiquities of C. are cromlechs, castles, and the cathedral church of Old Leighlin. A cromlech near Carlow town has a covering stone 23 feet long, and of nearly 90 tons.

CA'RLSBAD, or Kaiser-Karlsbad, a town in Bohemia, much celebrated for its hot mineral springs, and frequented in summer by visitors of the most aristocratic character from all parts of Europe. The permanent population does not amount to more than about 7000, who are very industrious, making carpets, knives, scissors, needles, woodwork, and articles of Bohemian glass, such as are likely to induce visitors to purchase. The visitors in a season, which usually lasts from 15th June

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to 15th August, amount to 15,000 or 18,000. The wells have been frequented from a very early period, but have been of great celebrity since the 14th c. The scenery is extremely beautiful. The town is well built, the accommodation for guests good, and the place free from some of the abuses too common at other German spas. No gaming-houses exist here. The temperature of the hot springs varies from 117° to 165° Fahrenheit. The principal spring, the Sprudel, has a very large volume, and is forced up to a height of 5 feet from the ground. Altogether, the daily flow of the springs of C. is estimated at 2,000,000 gallons. The principal ingredient in the water is sulphate of soda. The whole town of C. appears to stand on a vast caldron of boiling water, which is kept from bursting only by the safety-valves the springs provide. On one occasion, after an explosion, poles of 80 fathoms in length, thrust into the aperture, did not reach the bottom. A congress of German powers was held here in August 1819, in which various resolutions, denunciatory of a free press and liberal opinions, were arrived at, and measures of repression determined on.

CA'RLSBURG, or Karlsburg, a town of Transylvania, situated on the right bank of the Maros, here crossed by a bridge some 200 yards in length, 48 miles south of Klausenburg. It is built partly on a hill, and partly in a valley, is fortified, and has a citadel surrounded by walls with bastions. Gold and silver, obtained from the mines of Transylvania, are purified and coined here. The only manufacture of importance is saltpetre. Maros Porto, the chief shipping-place for Transylvanian rock-salt, is within half a mile of the town. C. occupies the site of the ancient *Apulum*, remains of which are still found. Pop. (1869) 7955.

CARLSCRO'NA, capital of the province of the same name in Sweden, is situated on the rocky island of Trotsö, and its adjoining islets in the Baltic, which are connected by bridges, in lat. 56° 9′ n., long. 15° 35′ e. The town was built in 1680 by Charles XI., who gave it his own name, and conferred upon it several important privileges, besides making it the great naval station and arsenal of Sweden, instead of Stockholm. It has a magnificent harbor, with a sufficient depth of water to float the largest vessels. The only practicable entrance for large ships is defended by two strong forts. The dry docks, blasted out of the granite rock at vast expense, are an attraction to strangers. The inhabitants are chiefly employed in connection with the arsenal. Pop. (1875) 16,877.

The province of C. or Blekinge is situated in the south of Sweden, in lat. 56°—56° 30′ n., long. 14° 30′—16° e. It has the Baltic on its south and east margins. It has an area of about 1120 square miles, with a population of 131,812. It is hilly without being mountainous, and generally fertile, yielding rye and potatoes abundantly, and also wheat, oats, and peas. The fisheries employ a considerable number of the inhabitants.

CA'RLSHAMN, a fortified town on the south coast of Sweden, about 30 miles west of Carlscrona, at the end of a beautiful valley. The harbor is small but secure, and a considerable trade in iron, timber, pitch, and tar is carried on. There are manufactures of sail-cloth, tobacco, hats, soap, and leather; there are also dye-works and ship-building yards. Pop. 5781.

CARLSRU'HE, the capital of the grand duchy of Baden, is situated a few miles eastward from the Rhine. It was founded by the Markgraf Charles-William of Baden-Durlach, in 1715, and built on a curious and regular plan in connection with the palace, which constitutes the centre point from which the streets, so far as constructed diverge in the shape of an extended fan. The streets are wide and well-paved. There are a number of fine buildings; flourishing educational institutions; the Court Library contains 80,000 vols; a public library, 90,000; and there are valuable collections of antiquities, objects of natural history, &c. An aqueduct from the Durlach supplies the town with water. In the market-place, which is the finest of the public squares, a stone pyramid encloses the remains of the founder of the city. The manufactures include machines of various sorts, engines, locomotives, railway carriages and wagons, jewellery, carpets, chemical products, and cloth. C. is generally spelt *Karlsruhe*. Pop. (1875) 42,768.

CA'RLSTAD, a town of Sweden on the island of Tingvalla, in Lake Wenern, about 160 miles west of Stockholm. It is connected with the mainland by two bridges, one of which is a large and very handsome structure. The town is well built, has a cathedral, cabinet of natural history, &c., and commands extensive

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views of the most beautiful scenery. Its trade is large, consisting in exports of iron, copper, timber, and corn. Pop. (1876) 6622.

CARLSTADT, a town of Croatia, in Austria, situated in a rich plain between the rivers Kulpa and Korona, 33 miles south-west of Agram. It is fortified—the original fortress having been erected in the 16th c. to resist the Turks—has an old castle, and armory of 30,000 stand of arms. It has a large garrison, the Austrian executive looking upon it as a place of considerable importance, on account of its position on a navigable river, and on the great road into the centre of Croatia from the coast. It has few manufactures, but an active transit trade. Pop. (1869) 5175.

CARLU'KE, a municipal burgh in the middle of Lanarkshire, near the right bank of the Clyde, 6 miles n. w. of Lanark. Pop. (1871) 3423. The neighborhood is rich in coal, iron, and limestone, and mining is the chief industry of the place. The orchards around cover 180 acres. Not far off is Lee, the seat of the Lockharts, where is preserved the famous Lee Penny, noticed by Sir W. Scott in the "Talisman." Roman coins have been found here. General Roy, the antiquary, author of the "Military Antiquities of the Romans in North Britain," was a native of Carluke.

CARLYLE, Thomas, was born 4th December 1795, in the town of Ecclefechan, parish of Hoddam, Dumfriesshire, Scotland. Educated first at the parish school, and afterwards at Annan, he passed to Edinburgh University, with a view to entering the Scottish Church, in his 15th or 16th year. Here he studied irregularly, but with amazing avidity. The stories which are related of his immense reading are almost fabulous. About the middle of his theological curriculum, C. felt wholly disinclined to become a clergyman, and, after a short period spent in teaching at Dysart, in Fifeshire, he embraced literature as a profession. His first efforts were contributions to Brewster's "Encyclopædia." In 1824, he published a translation of Legendre's "Geometry," to which he prefixed an Essay on Proportion, mathematics having, during his college years, been a favorite study with him. In 1823—1824 had appeared in the "London Magazine" his "Life of Schiller," and, during the same year, his translation of Goethe's "Wilhelm Meister." In 1825, the "Life of Schiller" was recast and published in a separate form. It was very highly praised; indeed, one can discern in the criticisms of the book certain indications of the genius of Carlyle. The translation of "Wilhelm Meister" met with a somewhat different fate. De Quincey, in one of his acrid and capricious moods, fell foul both of Goethe and his translator; while Lord Jeffrey, in the "Edinburgh Review," admitting C. to be "a person of talents," slashed in cavalier fashion at the book. In 1827, C. married Miss Welch a lineal descendant of John Knox, and during the same year, appeared his "Specimens of German Romance" (4 vols., Tait, Edinburgh). From 1827 to 1834, he resided chiefly at Craigenputtoch, a small property in Dumfriesshire, belonging to his wife—the "loneliest nook in Britain," as he says himself in a letter to Goethe, "fifteen miles north-west of Dumfries among the granite hills and the black morasses which stretch westward through Galloway, almost to the Irish Sea." Here C. revolved in his mind the great questions in philosophy, literature, social life, and politics, to the elucidation of which—after his own singular fashion—he has earnestly dedicated his whole life. Here, also, he commenced to write the splendid series of critical and biographical essays which first familiarised Englishmen with the riches of modern German thought. For this work, he was incomparably better fitted than any man then living in Great Britain. Possessing a knowledge of the German tongue such as no foreigner ever surpassed, he was also inspired by the conviction, that the literature of Germany in depth, truthfulness, sincerity, and earnestness of purpose, was greatly superior to what was admired and relished at home. Gifted, moreover, in a degree altogether unexampled, with a talent for portraiture, he soon painted in ineffaceable colors on the British memory, the images of Schiller, Fichte, Jean Paul Richter, and other foreign magnates, until then almost unheard of. Gradually, educated circles awoke to the fact, that a literary Columbus had appeared among them, who had discovered a "New World" of letters, the freshness and grandeur of which were sure to attract, sooner or later, multitudes of adventurous spirits. One of his most beautiful, eloquent, and solid essays written at Craigenputtoch, was that on "Burns" ("Edinburgh Review," 1828). It has given the tone to all subsequent criticism on the Scottish poet. The article

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on "German Literature," in the same periodical, is a masterly review of a subject, the importance of which C. at length succeeded in compelling his countrymen to acknowledge. But his *chef-d'œuvre*, written on his moorland farm, was "Sartor Resartus" ("The Tailor done over," the title of an old Scottish song). This work, like all his after-productions, an indescribable mixture of the sublime and the grotesque, was offered to various London firms, and rejected on the advice of their sapient "tasters," and at length published in successive portions in "Fraser's Magazine" (1833—1834). It professes to be a history or biography of a certain Herr Teufelsdröckh ("Devil's Dirt"), professor in the university of Weissnichtwo ("Kennaquhair"), and contains the manifold opinions, speculations, inward agonies, and trials of that strange personage—or rather of C. himself: The whole book quivers with tragic pathos, solemn aspiration, or riotous humor. C. now removed to London, where he still resides. In 1837 appeared the first work which bore the author's name, "The French Revolution, a History." Nothing can be more gorgeous than the style of this "prose epic." A fiery enthusiasm pervades it, now softened with tenderness, and again darkened with grim mockery, making it throughout the most wonderful image of that wild epoch. C. looks on the explosion of national wrath as a work of the divine Nemesis, who "in the fulness of times" destroys, with sacred fury, the accumulated falsehoods of centuries. To him, therefore, the Revolution is a "truth clad in hell-fire." During the same year, he delivered in London a series of lectures on "German Literature;" in 1838, another series on "The History of Literature, or the Successive Periods of European Culture;" in 1839, another on "The Revolutions of Modern Europe;" and a fourth in 1840, on "Heroes," "Hero-worship," and the "Heroic in History;" of these only the last has been published. Meanwhile, the first edition of his "Miscellanies" (contributions to the reviews) had appeared in 1838, and his "Chartism" in 1839. In 1843 followed "Past and Present," which, like its predecessor, shewed the deep anxious sorrowful interest C. was taking in the actual condition of his countrymen. In 1845, he published what is by many considered his master-piece—"Oliver Cromwell's Letters and Speeches, with Elucidations and a Connecting Narrative." The research displayed in this book is something marvellous, but the author has been nobly rewarded for his toil, inasmuch as his vindication of the Protector's character is most triumphant. To C. has thus fallen the unspeakable honor of replacing in the Pantheon of English history the statue of England's greatest ruler. In 1850, the "Latter-day Pamphlets," the fiercest, most sardonic, most furious of all his writings, came out. The violence of the language in these pamphlets offended many. Next year (1851) appeared the "Life of John Sterling"—a biography of intense fascination for the younger intellects of the age. In 1858—1860, C. published "The History of Frederick the Great;" and, in 1875, "Early Kings of Norway:" also "The Portraits of John Knox." C. was elected Lord Rector of Edinburgh University in 1865; and, in 1873, received the Prussian Royal Order "For Merit." In 1875, he was offered but refused the Order of the Bath.

That C.'s *genius* will never want ample recognition, is most certain; but his *writings* derive so much of their interest and power from what is peculiar to, or at least characteristic of, the present time, that future ages may possibly wonder at their fiery splendors, and fail to sympathise with their prophetic enthusiasms.

CARMAGNO'LA, a town of North Italy, situated near the left bank of the Po, about 16 miles south of Turin. It has a massive old tower, the remains of a very strong castle, which formerly served as a defence for the town. The *condottiere*, Francesco Bussone, afterwards Conte di Carmagnola, was a native of this place. It has manufactures of jewellery, and a trade in silk, flax, linen, cattle, and agricultural produce. Pop. 12,512.

CA'RMAGNOLE, the name of a popular song and dance, which was notorious as the accompaniment of many excesses in the French Revolution. It first became popular in the south of France, where it was named after Carmagnole, in Piedmont, the home of many Savoyard boys who played the tune. The song began with:

Madame Véto avait promis,

and every verse ended with the refrain:

Dansons la Carmagnole—vive le son—du canon!

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Fashion soon adopted the word, which was next applied to a sort of jacket, worn as a symbol of patriotism. Afterwards, it was applied to the bombastic and fanatical reports of the successes and glory of the French arms. With the Reign of Terror, the song and the jacket, associated with so many dismal recollections, together disappeared.

CAR'MEL is a mountain-ridge, 6 or 8 miles long, stretching nearly north and south from the plain of Esdraelon into the sea, the only great promontory on the low coast of Palestine. It is composed of a whitish stone, in which flints, sometimes curiously shaped, are imbedded. The height has been variously stated, but is probably about 1000 feet above the level of the plain. On the east is the river Kishon, and the Plain of Esdraelon; on the west, a small plain descending to the sea. Oaks, pines, olives, laurels, and other trees grow abundantly on the mountain; and various wild-fruits evince its ancient fertility and cultivation. The name C. means, *The Garden of God*, or "a very fruitful region." Mount C. is renowned in Jewish history, and is often alluded to in the imagery of the prophets. On the summit of Mount C., there is a monastery called Elias, after the prophet Elijah, the Monks of which take the name of "Carmelites." It is built on the supposed site of the grotto where Elijah lived, and the spot where he slew the priests of Baal. For an invalid in search of retirement, with every beauty that climate and natural scenery can offer, there can be no place superior to the convent on Carmel.

CARMEL, Kinghts of the Order of Our Lady of Mount, were instituted by Henry IV. of France, and incorporated with the Order of the Knights of St Lazarus of Jerusalem. The Order of Mount C. consisted of 100 gentlemen, all French, who were to attend the king in his wars, and had considerable revenues assigned to them. The order was confirmed by bull by Pope Paul V. in 1607. The great master was created by the king putting about his neck a tawny ribbon suspending a cross of gold, with the cloak of the order, and granting him power to raise 100 knights. None were admitted but those who had four descents of nobility both by father and mother.

CA'RMELITES, or Order of our Lady of Mount Carmel, a monastic order probably founded as an association of hermits on Mount Carmel by Berthold, Count of Limoges, about 1156. A legend, however, ascribes the foundation of the order to the prophet Elijah; and another makes the Virgin Mary to have been a Carmelite nun. Driven out by the Saracens in the 13th c., the C. wandered over Europe; and Simon Stoch, their general, changed them into a mendicant order in 1247. From that time, they shared in the usual vices of the mendicant orders. They subsequently divided into several branches, more or less rigid in their rules, one distinguished by walking barefooted. They exist at the present day in many Roman Catholic countries.—The order of *Carmelitesses*, or *Carmelite Nuns*, was instituted in 1452, and is very numerous in Italy.

CARMI'NATIVES (from Lat. *carmen*, a charm), medicines to relieve flatulence and pain in the bowels, such as cardamoms, peppermint, ginger, and other stimulating aromatics.

CA'RMINE, or Ca'rmin (Arabic, *kermes*), is a beautiful red pigment obtained from cochineal, and which is employed in the manufacture of the finer red inks, in the dyeing of silk, in coloring artificial flowers, and in miniature and water-color painting. It was first prepared by a Franciscan monk at Pisa, who discovered it accidentally, while compounding some medicine containing cochineal; and in 1656, it began to be manufactured. It is the finest red color known, and was more largely used formerly than now for imparting a healthy aspect to the cheek of beauty. One process for its preparation is to digest 1 lb. of cochineal in 3 gallons of water, for 15 minutes; then add one ounce of cream of tartar; heat gently for 10 minutes; add half an ounce of alum; boil for 2 or 3 minutes; and after allowing any impurities to settle, the clear liquid is placed in clean glass pans, when the C. is slowly deposited. After a time, the liquid is drained off, and the C. dried in the shade. In the preparation of C., much depends on a clear atmosphere and a bright sunny day, as the pretty color of the C. is never nearly so good when it has been prepared in dull weather, and this accounts in great part for the superiority of French C. over that prepared in England. The great expense of pure C. has led to the fabrication and vending of substitutes. The *rouge* of the theatres is made of red sandal-wood, Bra-

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ell-wood, benzoin, and alum, which are boiled in brandy or vinegar till a paint of an intense red color remains. A more harmless material is obtained by evaporating the mixture till the liquid is driven off, and making up the red residue with balm of Mecca, spermaceti, or butter of cacao. The depth of the red tint may be lessened by the addition of chalk. The little color-saucers called *rouge dishes*, obtained from Portugal, contain pure C.; but imitations are made in London. *Spanish wool* and *Oriental wool* which are impregnated with red paint, intended for use on the cheek for improving the complexion are seldom genuine.

CA'RMÖE, or Karmöe, an island of Norway, at the entrance of the Bukke Fiord in the North Sea, and 20 miles north-west of Stavanger, in lat. 59° 20′ n., long. 5° 15′ e. A strait 2 miles in width separates it from the mainland. With a length of 21 miles, and average breadth of 5, it has a population of 6400, who are principally engaged in the fisheries, and in cattle-rearing.

CARMO'NA, a town of Andalusia, Spain, 20 miles north-east of Seville. It is situated on an elevated ridge, overlooking a rich and olive-clad plain, and its old massive Moorish walls and castle give it a very picturesque appearance. It has a fine old Gothic church, and the gate of Cordova is a most interesting piece of architecture. It has manufactures of woollen cloth, hats, leather; also flour and oil mills and an important annual cattle-fair. Pop. 16,000.

CARNAC, a village in the department of Morbihan, France, 17 miles south-east of Lorient. It is remarkable on account of the great Celtic monument situated about three-quarters of a mile from the village, on a wide desolate plain near the sea-shore. The monument consists of 10,000—12,000 rude broken obelisks of granite, resting with their smaller ends in the ground, rising, many of them, to a height of 18 feet, though a large proportion does not exceed 3 feet, and arranged in 11 parallel rows, forming 10 avenues, extending from east to west, and having at one end a curved row of eighteen stones, the extremities of which touch the outer horizontal rows. The origin and object of the monument remains a mystery. Similar but smaller structures are found to the west of C., at Erdevan and St Barbe. Pop.(1876) 686.

CARNAHUBA PALM, or Caranaiba Palm (*Copernicia cerifera*), a very beautiful species of palm, which abounds in the northern parts of Brazil, in some places forming vast forests. It attains a height of only 20 to 40 feet; but its timber is valuable, is used in Brazil for a great variety of purposes, and is imported into Britain for veneering. The fruit is black, and about the size of an olive; it is sweet, and is eaten both raw and prepared in various ways. Scales of wax cover the under side of the leaves, and drop off when the fallen and withered leaves are shaken. Being collected in this way, the wax is melted into masses; and bees' wax is often adulterated with it. It has been imported into Britain, and used in the manufacture of candles, but no method has yet been devised to free it of its yellowish color.

CARNA'RIA (Lat. *caro, carnis*, flesh), the Latinised form of the French *Carnassiers*, the name given by Cuvier to a great order of *Mammalia*, which, according to his system, includes all the not marsupial *Feræ* of Linnæus, and along with them the bats, from the Linnæan order *Primates*. The C. have the toes terminated by claws; none of them have an opposable thumb on any of the extremities; they have incisors or cutting teeth, canine teeth or tusks, and molar teeth or grinders but their dentition varies according to their kind of food, some preying on insects, others on the higher animals, whilst many of them are by no means exclusively addicted to animal food, but subsist in great part, and a few bats entirely, on vegetable substances. Cuvier at first included the marsupial quadrupeds in this order; but afterwards, recognising more fully the great importance of the characteristic from which they derive their name, constituted them into a distinct order, the remaining C. being divided into *Cheiroptera* (Bats, q. v.), *Insectivora* (q. v.), and *Carnivora* (q. v.).

CARNA'TIC, a country of somewhat indefinite dimensions on the east or Coromandel coast of the peninsula of Hindustan. While some carry it as far inland as the Western Ghauts, other limit its breadth to about 75 miles. The length is generally taken from Cape Comorin to about 16° north. The C. is no longer a recognised division of the country, and exists only in history as the grand theatre of the struggle of last century between France and England for supremacy in India.

CARNA'TION (from Lat. *caro*, flesh.) Flesh-tints in paintings are called carna-

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tions. The art of producing the true color of flesh, from the rarity with which it is acquired by artists, would seem to be one of the most difficult branches of coloring. Whether from their painting less from the nude than the old masters, or from some other cause, it is certain that the moderns, and particularly the English, have been very unsuccessful in this respect. It is said that the pigments must be laid on thick and pasty. The ochres are preferable to vermilion for the local colors; and ultramarine ashes, or Veronese green, mixed with asphaltum, may be used for the shadows.

CARNATION, one of the finest of florists' flowers, a double-flowering variety of the Clove Pink (*Dianthus caryophyllus*, see PINK), and existing only in a state of cultivation. It has long been a universal favorite, both on account of its beauty and fragrance, although it does not appear to have been known to the ancients. The stem is about three feet high, and generally receives support. There are varieties, called *Tree Carnations* with much taller stems, but they are not amongst the varieties esteemed by florists. The flowers are often three inches or more in diameter. Scarlet, purple, and pink are the prevailing colors: but whatever are the colors of a C., it is of no value, in the eyes of a florist, unless they are perfectly distinct. Fulness and perfect regularity are also deemed essential. The varieties are extremely numerous; those which have only two colors, disposed in large stripes through the petals, are called *Flake Carnations*; those which have three shades of color, also in stripes, *Bizarre Carnations*; and those which have the flowers spotted with different colors, and the petals serrated or fringed, receive the name of *Picotees*. Great attention is at present paid in Britain to the cultivation of the C., and very fine specimens are often to be seen in the gardens of cottages, especially about towns and villages. The soil for carnations must be rich, rather open, and the manure well rotted and intimately mixed. The finest kinds are generally grown in pots, and receive protection from cold winds and heavy rains, although free access of air is indispensable. Carnations are propagated in summer either by layers or by *pipings*, which are short cuttings of shoots that have not yet flowered, each having two joints. The young plants are transferred in spring to the bed in which they are to flower.

CARNARVON, Henry Howard Molyneux Herbert, fourth Earl of, born in Grosvenor Square, 1831. His family is a branch of the House of Herbert, Earls of Pembroke, springing from Major-general the Hon. W. Herbert, whose son, Henry, was created, in 1780, Baron Porchester of Highclere, Hamphire, and advanced to the earldom of Carnarvon in 1793. The present earl was educated at Christ Church, Oxford, where he was first-class in classics in 1852. His father dying before he was of age to sit in the House of Commons, he lost the advantage of the training in public speaking and statesmanship which the sons of peers usually enjoy during the lifetime of their parents, in the Lower House. He took his seat on the Conservative benches, and soon shewed himself ambitious of parliamentary distinction. His earlier speeches in the House of Lords were not thought to exhibit much vigor and grasp of intellect, and were marred by a simpering and affected delivery. He was appointed governor of Carnarvon Castle in 1854. In 1858, he became Under-secretary of State for the Colonies, in the administration of the Earl of Derby. In 1859, he received the degree of D. C. L., and was elected High Steward of the University of Oxford. He resigned office with the Conservative ministry in 1859, and availed himself of the period of leisure thus obtained to visit the East. The feuds of the tribes in Lebanon had broken out in a massacre of the Christians; and the Earl of C. gave the world the benefit of his investigations, in an interesting work, entitled the "Druses (q. v.) of the Lebanon." On his return, he delivered lectures in the country, and speeches in the House of Lords, on prison-discipline, education, and other social subjects. When the Conservatives again returned to power in 1864, C. accepted from Lord Derby the office of Secretary of State for the Colonies, with a seat in the cabinet. In this he obtained for his colonial administration a large share of public confidence. He censured in calm and measured language the misconduct of the courts-martial during the Jamaica insurrection, and especially the trial and execution of Mr Gordon; and the pacification of the colony satisfactorily progressed under his instructions. During the recess, he developed and framed a plan for the confederation of the British North American colonies; and

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when parliament met in 1867, he explained the provisions of the measure in an elaborate speech. The bill met with general approval in both Houses, and it passed; but before it obtained the royal assent, C. had, with two other colleagues in the cabinet, resigned office upon the Reform Bill of the Derby government, which he regarded as democratic in its operation, and dangerous in its results. When the Reform Bill came before the House of Lords, C., in an animated speech, vindicated his consistency at the expense of his colleagues; and in the discussions in committee, he addressed the House with great vigor and argumentative ability. He edited in 1869 a work by his father, who was an accomplished scholar. It is entitled "Reminiscences of Athens and the Morea;" "Extracts from a Journal of Travels in Greece during 1839, by the late Earl of Carnarvon." He has also published one or two of his lectures. On Mr Disraeli's return to power in 1874, Lord C. resumed office as Secretary of State for the Colonies, and was one of the small cabinet of statesmen who inspired public confidence in the new Conservative government. Lord C. married, in 1861, the only daughter of the sixth Earl of Chesterfield.

CARNE'ADES, a Greek philosopher, born at Cyrene, in Africa, about 213 B. C. He studied logic at Athens under Diogenes; but became a partisan of the Academy, and an enemy of the Stoics, whose stern and almost dogmatic ethics did not suit his sceptical predilections. Conspicuous for his eloquence and skill in "tongue-fence," he was destitute of any convictions moral or intellectual, and had even arrived at the conclusion that no criterion of truth existed in man. In 155 B. C., along with Diogenes and Critolaus, he was sent as ambassador to Rome, where he delivered two orations on justice, in the first of which he eulogised the virtue, and in the second proved that it did not exist. Honest Cato, who had no relish for intellectual jugglery, and thought it a knavish excellence at the best, moved the senate to send the philosopher home to his school, lest the Roman youth should be demoralised. C. died at Athens, 120 B. C. He was remarkable for his industry, negligent habits, and impatient temper.

CARNE'LIAN, or Cornelian, in Mineralogy, the name given to some of the finer varieties of Chalcedony (q. v.). The color is blood red or flesh-color, reddish brown, reddish white or yellow, more rarely milk white. The fracture is in the common C. perfectly conchoidal, but there is a variety of a somewhat fibrous structure with a splintery fracture. C. is found in pieces of irregular form and in lamellar concretions. The finest specimens are brought from the East, but it is found in Scotland and in many parts of Europe and America. It is much used by the lapidary, and in the East it is prized beyond every other stone, the gems excepted. Bright red C. of unmixed color is most highly valued, but a mass of considerable size is seldom found with the color equal throughout.

CARNIO'LA (Ger. *Krain*), a crown-land of the Austrian empire, formerly part of the kingdom of Illyria, has an area of 8850 square miles, with a population (1869) of 466,384, being a decrease of nearly 40,000 as compared with the census return of 1834. A continuation of the Carinthian Alps passes through it in the north, and the Julian Alps in the south. The scenery of the country abounds in interesting and singular features, amongst which one of the most notable is the rock-bridge of St Kanzian, 180 feet high, and 160 feet broad, with a perfect arch 62 feet high, and 154 feet long. The Save is the principal river; the Kulpa is its chief tributary. The singular lake of Zirknitz (q. v.) is in Carniola. The climate of C. is in general mild, except in the high mountainous parts. The country does not produce corn or cattle enough to supply the wants of its inhabitants. Millet, pulse, and wild-fruits are principal articles of food with many of the lower classes. Maize is cultivated in some places, and some districts yield excellent wines and much fine fruit. Flax is largely cultivated; silk is produced in some places, and much honey and bees' wax. The principal products of the mineral kingdom are iron, quicksilver, and marble; the quicksilver mines of Idria are the most important in Europe. Linen-weaving, and the manufacture of a coarse lace, are common among the peasantry. Laybach is the capital.

C. received its present name after the settlement here of the Slavonic Wends. Charlemagne conquered it, and gave it to the dukes of Friuli. From 972 it had markgraves of its own, sometimes called Dukes, who possessed, however, only a part of the country. On the extinction of the male line of the markgraves, part of

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the territory passed to the Dukes of Austria, in the 13th c., and the remainder was acquired by them in the 14th c. The vast majority of the inhabitants are Slavs of the Slovenian branch.

CA'RNIVAL (from the Lat. *caro*, flesh, and *vale*, farewell—"farewell to flesh!"), a festival in Italy, which originally began on the feast of the Epiphany, and continued to Ash-Wednesday, when the fast of Lent made an end of the preceding feasting, masquerading, and buffoonery. In later times, the C. was limited to the time of from three to eight days before Ash-Wednesday. Without doubt, the forms and customs still preserved in the celebration of the C. originated in the heathen festivals of spring-time; and they still remind us, partly of the Lupercalia and Bacchanalia of Southern Europe, and partly of the Yule-feast among northern peoples. Banquets of rich meats and drinking-bouts were the chief attractions of the C. during the middle ages. Shrove-tide (q. v.), or Shrove-Tuesday, called also Fasten-Even or Pancake-Tuesday, was a relic of the English C., and formerly a season of extraordinary sport and feasting. The rich commenced the festive time at the feast of Epiphany, or on "Three Kings' Day;" but the middle classes restricted their days of revelry to the week immediately preceding Lent; while the poor indulged in only a few days of mad mirth. According to a papal order, the clergy were allowed to commence their bacchanalia two days before the laity. The several chief days of C. had distinct names, such as "fat" or "greasy Sunday," "blue Monday" (or "fool's consecration"), &c. The Tuesday before the beginning of Lent was especially styled C.—the *Fastnacht* of the German people. The customs of making presents of green nosegays or garlands, and planting fir-trees before houses during C., reminds us of the *thyrsus* of the ancient Bacchanals, and equally of the decorations of the Yule-tide or Christmas season among northern people. The ancient custom, also, of scourging women accidentally met with during the Lupercalia (q. v.), was preserved in the mediæval observance of the carnival. In most countries, especially where Protestantism prevails, the observance of the C. is now limited to dancing and masked balls on certain days; but in Italy, as Goethe says in his charming sketch of the Roman C., it is still a general popular festive time. In former times, Venice was distinguished by the pomp and splendor of its C.; but afterwards, Rome became most prominent. The years of angry politics, 1848 and 1849, had a discouraging effect on the attempts which had been made to restore the gaiety of C. in the Roman Catholic towns of Germany.

CARNI'VORA (Lat. flesh-devouring), in Cuvier's system of zoology, a principal division of the order of *Mammalia* called *Carnassiers* or *Carnaria* (q. v.), and including the most *carnivorous* or sanguinary of that order—the quadrupeds which chiefly prey on other vertebrate and warm-blooded animals. The C. have six incisors or cutting teeth in each jaw; their tusks or canine teeth are very strong, and even their molar teeth or grinders are usually furnished with cutting edges. But even the C. are carnivorous in very different degrees, and some of them have teeth and other organs adapted to a partial use of some kinds of vegetable food. Cuvier subdivided the C. into three tribes—*Plantigrada* (q. v.), *Digitigrada* (q. v.) *Amphibia* (Seals, q. v., &c.). The digestive apparatus of carnivorous animals is more simple than that of the herbivorous; the stomach is single, and in general of comparatively small size, and the intestines are comparatively short and unvoluminous. Their muscular energy is very great, their respiration and circulation very active, and their demand for food very constant. Some of them are adapted for seizing their prey by leaping, others by running, a few by swimming and diving. Most of them can only seize it with their mouths; but some have also, for this purpose, sharp retractile claws.

CARNOT, Lazare Nic las Marguerite, born May 13, 1753, at Nolay, in the department of *Côte d'Or*, Burgundy, gained distinction at an early p riod by his tal nts in mathematical cience and ilit ry engineering In 1791, he became a member of the Legislative Assembly, and, in the Conv ntion, voted for the death of Louis XVI. After taking the command of the army of the north, and gaining the victory of Wattignies, he was elected into the Committee of Public Safety, in which he was intrusted with the chief direction of military affairs, and greatly contributed to the successes of the French army. Though he endeavored to restrict the power of Robespierre, he was accused, with others, after the Reign of Terror; but

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the charge was dismissed. In 1797, having opposed the extreme measures of Barras, his colleague in the Directory, C., as a suspected royalist, was sentenced to deportation. He escaped into Germany, where he wrote his defence, which conduced to the overthrow of his colleagues in 1799. The 18th Brumaire brought him back to Paris, where he was made Minister of War, 1800; and by his energy, skill, and fertility of administrative resource, helped to achieve the brilliant results of the Italian and Rhenish campaigns. He retired, however, from his office when he understood the ambitious plans of the emperor, but hastened, when he witnessed the reverses of the empire, to offer his services to Napoleon, who gave him the command of Antwerp in 1814; which he heroically defended. During the Hundred Days, he held office as Minister of the Interior; and after the second restoration, retired first to Warsaw, and next to Magdeburg, where he died, August 2, 1823. Among C.'s numerous writings on mathematics and military tactics, &c., we may notice his "Essai sur les Machines en Général" (1786) "Réflexions sur la Métaphysique du Calcul Infinitésimal" (1797), and the "Géométrie de Position" (1813).—His son, LAZARE HIPPOLYTE CARNOT, born at St Omer, April 6, 1801, one of the leaders of the French democracy, was in early life a disciple of St Simon, but, like others, left that school on account of the lax morals advocated by Enfantin—protesting against "the organisation of adultery"—and devoted himself to the inculcation of a more orthodox and virtuous socialism in various periodicals. In 1847, he declared himself a republican in his brochure, "Les Radicaux et la Charte;" and, after the February Revolution, was appointed Minister of Public Instruction, but not finding himself in sufficient *rapport* with his colleagues, he resigned. In 1863, he entered the Corps Législatif, and the National Assembly in 1871. He has written an "Exposé" of St Simonianism and "Mémoirs" of Henri Gregoire and of Barrère.

CA'ROB, Algaroba, or Locust-Tree (*Ceratonia siliqua*), a tree of the natural order *Leguminosæ*, sub-order *Cæsalpinieæ*, a native of the countries around the Mediterranean Sea, in size and manner of growth much resembling the apple-tree, but with abruptly pinnate dark evergreen leaves, which have about two or three pair of large oval leaflets. The flowers are destitute of corolla; the fruit is a brown leathery pod, 4—8 inches long, a little curved, and containing a fleshy and at last spongy and mealy pulp, of an agreeable sweet taste, in which lie a number of shining brown seeds, somewhat resembling small flattened beans. The seeds are bitter and of no use, but the sweet pulp renders the pods an important article of food to the poorer classes of the countries in which the tree grows. They are very much used by the Moors and Arabs. They are also valuable as food for horses, for which they are much employed in the south of Europe, and have of late years begun to be extensively imported into Britain, under the name of *Locust Beans*, which name and that of *St John's Bread* they have received in consequence of an ancient opinion of tradition, that they are the "locusts" which formed the food of John the Baptist in the wilderness. It seems probable that they are the "husks" (*keration*) of the parable of the Prodigal Son.—The Arabs make of the pulp of the C. a preserve like tamarinds, which is gently aperient.—The C. tree is too tender for the climate of Britain. Dr Royle thinks its introduction into the north of India would be an important addition to the resources of that country, and a valuable safeguard against famine. The produce is extremely abundant, some trees yielding as much as 800 or 900 lbs. of pods. The wood is hard, and much valued, and the bark and leaves are used for tanning.—The LOCUST-TREE (q. v.) of America is quite distinct from this.

CAROLI'NA, North, an Atlantic state of the American Union, having South Carolina and Georgia on the s., Tennessee on the w., and Virginia on the n., lat. 33° 53'—36° 33' n., and long. 75° 25'—84° 30' w., being about 450 miles long, and about 180 broad, with an area of about 50,704 square miles. The census of 1880 gave 867,242 whites, 531,277 negroes, and 1,230 civilized Indians—1,399,750 in all. North Carolina was restored to a place in the Union in 1868, after a new constitution had been adopted by the state government, and approved by Congress. It sends 8 members to the Lower House of Congress, returning also, in common with every other state, 2 senators to the Upper. The public debt of North C., in 1874, was 88,921,848 dollars, and its valuation of property was 143,728,813 dollars. Annual expenses of government, 1,400,000 dollars. Of railways, there were, in the year 1875, in actual

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operation 1346 miles. The principal rivers are the Chowan, Roanoke, Tar, Neuse, and Cape Fear. Of these, the first four divide themselves equally between Albemarle and Pamlico Sounds—inlets which, besides being shallow and difficult in themselves, are almost entirely cut off from the sea by a nearly continuous series of low islands—and the last of the five, though it does fall into the open ocean, is yet not materially superior to the others, never shewing more than 14 feet of water on the bar. With this insular breast-work, the mainland is geologically connected to a depth of about 60 miles, being everywhere alluvial, and in many places swampy. To the west of this belt, the country, after undulating into hills, is traversed by the ridges of the Alleghanies, which culminating in Mount Mitchell to an elevation of 6470 feet, bear aloft between them a table-land of fully one-third of that altitude. Through the maritime tract, and even beyond it, the rivers are generally practicable for steam-boats. Among the productions, the most characteristic is the pitch-pine of the lower levels; so that, in the matter of naval stores, this state surpasses all the rest of the Union taken together. In mineral resources, also, North C. takes a lead, more especially in gold, copper, iron, and coal. The value of the manufactured products of North C. in 1870 was 19,021,327 dollars; the value of the cotton brought to its shipping ports in 1876 was £1,122,959. The chief towns are Raleigh, the capital near the Neuse; Wilmington and Fayetteville on the Cape Fear (the former within reach of tide-water, and the latter at the head of the navigation); New Berne, and Charlotte. North C. was first permanently colonised from Virginia in 1653. Down to 1693, it continued to form one province along with South Carolina, the two being frequently still called the Carolinas. In a local declaration of independence of May 1775, 14 months before the 4th of July 1776, North C. first demanded a separation from Great Britain.

CAROLINA, South, an Atlantic state of the American Union, of a triangular form, with North Carolina and Georgia on its inland sides. It extends between 32° and 35° 10′ n. lat., and 78° 25′ and 83° 20′ w. long., having an area of 34,000 square miles. In 1870, the total population of South C. was 705,606; of whom 289,667 were whites, 415,814 negroes, and 124 civilised Indians; in 1880, the population was 995,-577. The total population in 1800 was 345,591. South C. formerly differed from all the other states in appointing its presidential electors, and its executive, not by the popular suffrage, but by the joint vote of the two branches of the local legislature, being thus pre-eminent in the aristocracy of its constitution. In 1863, however, in the reconstruction of the Southern States, South C. was restored to a place in the Union, with a new constitution adopted by a majority of voters, and approved by Congress. It is represented in Congress by 5 members in the Lower House, besides the 2 senators which each state possesses alike. Physically a continuation of its northern neighbor, South C., behind a breast-work of islets, presents a low belt, generally swampy, of about 100 miles in depth, rising backward through an undulating region to a height of 4000 feet in the Alleghanies. With such a range of soil and climate, the productions are very various—cotton, rice, tobacco, indigo, sugar, silk, maize, and wheat. In the first two articles, South C. stands pre-eminent, yielding nearly as much rice as all the other states together, and more cotton, in proportion to area, than any other state. Its mineral treasures are chiefly granite, sienite, marble, and gneiss, from the primitive formations of the state, for building; along with gold, lead, and iron: it is probable that no coal will be found. The public indebtedness of South C. in 1874 was 17,017,651 dollars, and the assessed value of property in 1873 was 176,956,502 dollars. Since the reconstruction of the state, public institutions have made great progress. With not much more than 50 miles of canal, South C. has 1400 of railway. The chief rivers, each the receptacle of considerable affluents, are the Great Pedee, Santee, and Edisto, and also the Savannah, as common to Georgia and South C., the whole being said to furnish an inland navigation of 2400 miles. The cotton product of South C. in 1866 amounted to 112,378 bales; in 1868 to 240,225; and in 1873–4 to 438,194 bales. The value of the cotton brought to the shipping ports of South C. in 1876 was £4,320,568. The chief towns are Charleston, Columbia (the capital), Georgetown, and Greenville.

CAROLINA PINK. See SPIGELIA.

CA'ROLINE, Amelia Elizabeth, wife of George IV. of Great Britain, was the second daughter of Charles William Ferdinand, Duke of Brunswick Wolfenbüttel,

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and of the Princess Augusta of Britain. She was born on 17th May 1768, and spent her youth under great restraint at her father's court. In 1795, she was married to the Prince of Wales. The marriage was disagreeable to him, and although she bare him a daughter, the Princess Charlotte, he separated from her immediately on her recovery from childbed; and she lived by herself in a country residence at Blackheath, the object of much sympathy, the people regarding her as the victim of her husband's love of vice. Reports to her discredit led the king, in 1808, to cause investigation to be made into her conduct, which was found to be imprudent, but not criminal. In 1814, she obtained leave to visit Brunswick, and afterwards to make a farther tour. She visited the coasts of the Mediterranean, and lived for some time on the Lake of Como, an Italian, by name Bergami, being all the while in her company. When her husband ascended the throne in 1820, she was offered an annuity of £50,000 sterling to renounce the title of queen, and live abroad; but she refused, and made a triumphal entry into London, whereupon the government instituted proceedings against her for adultery. Much that was very offensive was proved as to her conduct; but the manner in which she had been used by her husband, and the splendid defence by Brougham, caused such a general feeling in her favor, that the ministry were obliged to give up the Divorce Bill, after it had passed the House of Lords. She now fully assumed the rank of royalty, but was refused coronation, and turned away from the door of Westminster Abbey on the day of the coronation of her husband. She died on 7th August 1821.

CARO'RA, a town of Venezuela, South America, in the province of Caro, 210 miles west-south-west of Caracas, and 60 miles east of Lake Maracaybo, on the Tocuyo. The town is well built, has a handsome parish church convent, hermitage, &c. There are manufactures of leather, ropes, and fine hammocks from the fibre of the *Agave fœtida*. A trade is carried on in agricultural produce, and in the aromatic balsams, resins, gums, and wild cochineal for which the district is famous. The pop., which was formerly much larger, is now about 6000.

CARO'TID A'RTERY. The great artery which on each side distributes blood to the different parts of the head, appears to have derived its name either from Gr. *kara*, the head, or, more probably, from Gr. *karos*, sleep, there being an old idea, which the researches of Dr. Alexander Fleming have shewn to be correct, that there was some connection between deep sleep and compression of these vessels.

Each C. A. consists of the primitive or common carotid, which, at the upper margin of the larynx or organ of voice, separates into two great divisions, of nearly equal size—The external and the internal carotid. The external carotid supplies the larynx, tongue, face, and scalp with blood; its principal branches being the superior thyroid, the lingual, the facial, the occipital, the posterior aural, the internal maxillary, and the temporal. The last-named artery is occasionally opened by the surgeon in preference to a vein, as, for example, in certain cases of cerebral apoplexy. The internal carotid enters the cavity of the cranium through a somewhat tortuous canal in the temporal bone, and after perforating the dura mater, or fibrous membrane of the brain, separates into the anterior and middle cerebral arteries which are the principal arteries of the brain; while in its course though the dura mater, it gives off the ophthalmic artery, which subdivides into several small branches that supply the eye and surrounding parts. See CIRCULATION.

Surgery.—Wounds of the carotid trunks are generally from stabs. Suicides have a vague desire to cut them, but rarely cut sufficiently deep by the side of the windpipe. Of course, should either vessel be wounded, death results almost immediately. Punctured wounds, however, may not be imediately fatal; they may heal, or a false Aneurism (q. v.) may result. Such an occurrence happened about twenty years ago in Scotland. A young man was stabbed close to the root of the neck; a pulsating tumor formed, which rapidly increased, and would undoubtedly have burst before long, had not Professor Syme of Edinburgh cut into it, and, by an operation requiring extraordinary courage and dexterity, tied the common C. A. above and below the part stabbed; thereby saving not only the life of the patient, but that of the man who had inflicted the wound, and who was then in prison awaiting his trial.

Sir Astley Cooper was the first to tie the common carotid for spontaneous aneurism, in November 1805; and since then the operation has been successfully per-

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formed in a number of cases. Owing to the numerous interchange of branches between vessels of both sides of the head, cutting off the supply of blood through one carotid is seldom followed by affections of the brain. Such have, however, occurred in a few instances; but Dr Mussey of America tied both carotids within twelve days of each other without any such result.

The common carotid in the horse is the termination of the right arteria innominata. It is a large vessel, about an inch long, which emerges from the chest below the windpipe, and divides into the *right* and *left* carotids. These bend upward, having the windpipe between them, gradually inclining inwards at the upper part, where each divides into external and internal carotid, and a large anastomosing branch arising from between these two.

CAROUGE, a town of Switzerland, in the Canton and about one mile south of Geneva, on the left bank of the Arve. It is beautifully situated, regularly built, and surrounded by villas, orchards, and meadows. It has a handsome Roman Catholic and a Protestant church. There are manufactures of thread, clay pipes, leather, watches, and pottery. There is a bridge across the Arve connecting the town with Geneva. Pop. (1870), 5971.

CARP, (*Cyprinus carpio*), a fish of the family *Cyprinidæ* (q. v.), of which, indeed, it may be regarded as the type, a native of the central countries of Europe, and corresponding latitudes in Asia, but on account of its value as an article of food, long naturalised in many countries in which it is not indigenous. No fish, indeed, except its congener the gold fish, has been so much transported by man from one place to another; and this has been the more easily and successfully accomplished, that the C. can subsist longer than most fishes out of the water, if only kept moist. The C. is said not to be originally a native of England, but the statements sometimes made as to the time of its introduction are untrustworthy; it certainly existed in England before the 16th century. It is mentioned in the famous Boke of St Albans, in 1496, by Dame Juliana Barnes, as a "dayntous fyssshe, but scarce." The C. spawns in May, and is out of condition until July. It does not succeed so well in Scotland, of which country it is certainly not a native, as in the south of England; and in northern countries generally, it neither increases so rapidly in size, nor exhibits so great fecundity, as in more congenial climates. Its fecundity, in favorable circumstances, is prodigious; more than 700,000 eggs have been found in the ovaries of a single C. of moderate size. The C. is rather an inhabitant of lakes and ponds than of rivers, in which, if it is found, it shews a preference for the stillest parts. It feeds chiefly on aquatic plants, and may be fattened on lettuces and similar soft vegetables, for which its teeth are remarkably adapted, being few, mostly large, flat, and situated on the pharynx very far back in the mouth; worms, mollusks, and insects, however, form part of its food. It deposits its spawn on weeds. It is said to live to a great age, even 150 or 200 years; its scales, "like the productions of the cuticle in some other animals, becoming gray and white with age." It is known to attain the weight of 3 lbs. when six years old. A C. of 18 or 19 lbs. weight is deemed of extraordinary size in England, but one of 70 lbs. weight, and nearly 9 feet long, was taken near Frankfort-on-the-Oder, and 30 or 40 lbs. is not an unusual size in some of the German lakes. In Austria and Prussia, many lakes and ponds are let at a high rent for the C. which they contain.—Of the other species of the genus *Cyprinus*, as now restricted, which are found in Britain, none belong to the section having barbules at the angles of the mouth. See CRUCIAN, GIBEL, and GOLDFISH.

To the angler, the C. is not a very valuable fish, as he is by no means a free biter. When hooked, however, he runs strongly, and fights with considerable determination and cunning. In still water, the best means of fishing for C. is with a very light quill-float. A small piece of dead rush will answer the purpose equally well, or better. The float should be fixed on the line so that the bait may be *upon* the bottom, and if that be clear of weeds (the angler must take care that it is so), the C. will easily see and pick up the bait. It is advisable, however, in fishing for C., to use two rods, and the float to one of these should be so placed that the bait may be just *off* the bottom. The former tackle should be baited with well-scoured red worms, gentles, or grubs of some sort; the latter with a green pea, boiled wheat, or paste. The hooks should be of No. 8 size, and tolerably stout in the wire and the gut perfectly

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round and good, and as fine as is consistent with the size of the fish angled for. In using green peas or wheat, boil until the skin cracks. Very small potatoes of the size of a bean have been known to attract good carp. The best paste is bread worked up with a little brandy or gin. Gentles, wasp, grubs, flies, and other insects, worms or caterpillars, may all, at times, take carp. When a C. bites, he nibbles at the bait for some seconds before he takes it, and often takes off the tail of the worm, or strips the hook completely. But it is quite useless to strike until the float disappears entirely.

CARPA'THIAN MOUNTAINS, the mountains which enclose Hungary and Transylvania on the north, east, and south in a great semicircle (whose concavity is towards the south-west), extending over a space of 800 miles from Presburg on the Danube to Orsova on the same river, between lat. 44° 30'—49° 40' n., long. 17°—26° e. The C. M. forms part of the great mountain system of Central Europe, separated from the mountains of Silesia and Moravia by the Valley ley of the March, and from the Alps and Mount Hæmus by the Valley of the Danube. Almost the whole of the C. M. lie within the Austrian dominions. They form two great masses, one in Hungary to the north-west, and one in Transylvania to the south east, with ranges of lower and wooded mountains between. The highest group of the Hungarian Carpathians is that of *Tatra* or the *Carpat*, in the very north of Hungary, a majestic mass of granite mountains, exhibiting much grandeur in its naked precipices, and in some of its peaks rising to the height of more than 8000 feet, the Lomnitz peak being 8133 feet high. On the northern declivity of the Eisthal peak exists the only glacier in the Carpathians. The Tatra group is penetrated by no valleys, but only by wild ravines, and is separated from the rest of the range by deep depressions. There is a great difference of climate between its southern and northern sides. These higher mountains yield few minerals, but the lower Carpathians of Hungary, which stretch around them in groups and ranges, abound in minerals of various kinds. The mines of Schemnitz (q. v.) are of great celebrity. Many of the Hungarian mountains are of limestone. The mountains of Transylvania are mostly of primitive rocks. On the eastern and southern borders, they reach the height of 9000 feet and upwards. Mount Butschetje, the culminating peak, has an elevation of 9528 feet above the sea. The C. M. are generally clothed with wood to a height of more than 4000 feet—in some parts forests are found at 5500 feet—and with steep precipices, narrow ravines, extinct craters, and cones of volcanic origin, they exhibit scenes of grandeur rarely exceeded. The lower parts of the mountains are beautifully clothed with vineyards, walnut groves, &c., above which ascend forests of cherry, beech, and pine. The ranges which connect the high mountains of Hungary with those of Transylvania are in great part composed of sandstone, have an unfruitful soil, and comparatively little population or cultivation.

CA'RPEL (Gr. *karpos*, fruit), in Botany, a modified leaf forming the whole or part of the pistil of a flower. The number of ovaries and stigmas in the pistil depends on the number of carpels of which it is composed, but sometimes several are so intimately united that they appear as one. It is the upper surface of the leaf which forms the inner surface of the carpel. At its margins, the ovules are developed, like the buds formed on true leaves of some kinds of plants. The fruit, as well as the pistil, may therefore be said to be composed of one or more carpels.

CARPENTA'RIA, Gulf of, a broad and deep indentation of the north coast of Australia, stretching from 11° to 17° 30' s. lat., and from 136° to 142° e. long. It is said to have been named from Carpenter, a Dutchman, who discovered and partly explored it in 1627. The Gulf of C. contains many islands. The shores of the mainland are generally low; and, in the rainy season, the floods are such as materially to freshen the sea.

CARPENTER, Mary, daughter of the Rev. Dr Lant Carpenter of Bristol, and sister of Dr William Carpenter (b. 1807, d. 1877). She took an active part in the movement for the reformation of neglected children, and besides advocating their cause in her writings, she founded several reformatories for girls, one of which, the Redhedge Reformatory, she superintended. In the prosecution of her philanthropic labors she visited India three times, and in 1871 instituted the National Indian Association, whose journal she edited. Besides her reformatory writings she published

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"Our Convicts" (1864), a book which drew public attention to the treatment of young criminals; "The Last Days of the Rajah Rammohun Roy;" and "Six Months in India."

CARPENTER, William Benjamin, M.D., LL.D., F.R.S., F.L.S., F.G.S., one of the most distinguished physiologists and writers on physiology of the present day. Soon after his graduation in Edinburgh in 1839, he published his "Principles of General and Comparative Physiology," which was one of the earliest works giving a general view of the science of life. As the treatise grew in size in successive editions, it was divided into two—"The Principles of Comparative Physiology," and "The Principles of General Physiology." These works, together with "The Principles of Human Physiology," which originally appeared in 1846, and reached a fourth edition in 1853, and "The Principles of Mental Physiology" (Lond. 1874), form a perfect cyclopædia of biological science. C. has likewise published "A Manual of Physiology;" "The Microscope, its Revelations and its Uses;" a prize essay upon "The Use and Abuse of Alcoholic Liquors;" and numerous memoirs on various departments of Physiology, Microscopical Anatomy, and Natural History, in the "Philosophical Transactions," &c. His most important original researches are "On the Structure of Shells;" "On the Development of Purpura Lapillus;" and "On the Structure, Functions, and General History of the Foraminifera." For several years he edited "The British and Foreign Medico-Chirurgical Review," and he was one of the editors of "The Natural History Review." In 1848, he was appointed Professor of Medical Jurisprudence at University College, and soon afterwards Examiner in Physiology and Comparative Anatomy in the university of London; but he resigned these offices on his appointment, in 1856, as Registrar to that university. In 1861, the Royal Medal was awarded to him by the Royal Society; and in 1873, he was elected a corresponding member of the Institute of France. He took a chief part in the government expeditions sent out in 1868–69–70 for deep-sea exploration in the North Atlantic; and since then he has contributed largely to the discussion of the vexed question of ocean-circulation in the Journal of the Royal Geographical Society and other periodicals. In the art. ATLANTIC in the "Ency. Brit.," 9th ed., his views will be found summarised. He advocates the doctrine of a *vertical circulation* sustained by opposition of temperature only, independent of and distinct from the *horizontal* currents produced by winds; see GULF STREAM. This doctrine was first advanced by Professor Lenz of St Petersburg in 1845; but Dr. C. was ignorant of this, when the deep-sea observations begun in 1868 led him to an identical theory. Dr C. has written largely on another controverted subject—that of spiritualism, which he maintains to be a delusion. He entered this field as early as 1853, in an article on Animal Magnetism in the "Quarterly Review;" a late contribution to the controversy is "Mesmerism, Spiritualism, &c. historically and scientifically considered" (Longmans & Co., 1871).

CARPENTER BEE, a name given to those bees that excavate their nests in wood. One of these, *Xylocopa violacea*, has been already noticed, and its nest briefly described, in the article BEE (q. v.).

CARPENTRAS, a town of France, in the department of Vaucluse, is situated on the left bank of the Auzon, about 15 miles north-east of Avignon. This town was known to the Romans as *Carpentoracte*, and among other remains, a triumphal arch attests their former presence here. C. has manufactures of cottons, woollens, and leather; brandy distilleries, dye-works, &c. It is the entrepôt for the products of the district. Pop. (1872) 7857.

CA'RPENTRY is the art of framing timber for architectural and other purposes. Technically, the term is restricted to the framing of heavy work, such as the roofs, floorings, partitions, and all the wood-work concerned in maintaining the stability of an edifice, while the minor and ornamental fittings are called Joinery; but popularly the workman who does either kind of work is called a carpenter.

The present article will be confined to a popular description of the most useful methods of framing timber and smaller wood-work.

The preliminary preparation of timber is the work of the sawyer, who, by the saw-mill or pit-saw, divides the trunks of trees into planks, &c.; these are further divided by the carpenter, who uses hand-saws of various kinds, according to the

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work. For dividing wood into separate pieces in the direction of the fibre, the *ripping-saw* is used; for cross cutting, or sawing thin pieces in the direction of their length, the common *hand-saw* or the finer toothed *panel-saw;* for making an incision of a given depth, and for cutting small pieces across the fibre, the *tenon-saw*, the *sash-saw*, or *dovetail-saw* is used. These are thin saws, stiffened by a strong piece of metal at the back to prevent crippling. When a curved cut is to be made, a very narrow saw without a back, called a *compass-saw* or a *keyhole-saw*, is used. The general name for these is *turning-saws;* they have their plates thin and narrow towards the bottom, and each succeeding tooth finer, and the teeth are not bent on contrary sides of the plate for clearing, as in broad saws.

The surface of wood is smoothed by planing. According to the work, different kinds of planes are used: the *jack-plane*, which is large and rough, for taking away the rough of the saw; the *trying-plane*, for bringing the surface perfectly level and true, or the *long-plane* for the same purpose, where the work is of great length, as for the joining edges of long boards to be glued together. The *smoothing-plane*, which is much smaller than these, gives the smooth finished surface. The *spoke-shave*, a sort of plane with a double handle, is used for paring and smoothing rounded work.

Ornamental mouldings are cut by means of moulding-planes, which have their cutting-edges curved to the required pattern. A good stock of these is one of the most expensive items of the tool-chest.

The paring of wood, and the cutting of rectangular or prismatic cavities, notches, &c., are done by means of *chisels*. Those for cutting across the fibre are called *firmers* or *paring-chisels;* those for cutting deep and narrow cavities, *mortise-chisels*, which are made very thick and narrow, and fitted in the handles with a strong flange, to bear heavy blows with the mallet. Chisels for paring concave surfaces are called *gouges*. For boring holes, *brad-awls*, *gimlets*, *centrebits* and *gouges* are used—the two latter are fixed in a *stock* or revolving handle, and are used for large holes. When it is required to ascertain if an angle be square or of any given inclination, the *square*, or the *bevel* set to the required angle, is applied to test the the work as it proceeds. When parallel edges are required, the *marking gauge* is used to draw the line to be worked to. When a simple straight line is required for working to, a piece of string is chalked, then stretched tightly over the wood and lifted in the middle, when, by its recoil, it strikes the wood and leaves a straight chalked line. The *straight-edge*, a strip of wood with one of its edges perfectly straight, is applied to detect superficial irregularities. The operation of planing the edge of a board straight is called *shooting*, and such edges are said to be *shot*. When the joiner requires to ascertain whether the surface of a piece of wood is all in one plane, he takes two slips of wood with edges perfectly straight and parallel, and of equal width; these slips, called *winding-sticks*, are placed edge upwards, one at each end, across the board, and the workman looks in the longitudinal direction of the board over the upper edges and if the two edges be not in the same plane, the board is planed down at the elevated parts until it is *out of wind*. For setting work level, a spirit-level, set in a wooden frame, or a plumb-level is used. For further description of the tools alluded to above, and in the rest of this article, see the special articles.

When two pieces of timber have been united at their ends, as in lengthening the beams for roofing, partitions, the masts and keels of ships, &c., the operation is called *scarfing*, and the joint a *scarf*. The methods of scarfing are very numerous. The following are the principal rules for scarfing as stated by Tredgold.

The length of the scarf should be, if bolts are not used—in oak, ash, or elm, six times the depth of the beam; in fir twelve times the depth of the beam. If the bolts and indents are combined, the length of the scarf should be in oak, ash, or elm, twice the depth of the beam; in fir, four times the depth. In scarfing beams to resist transverse strains, straps driven on tight are better than bolts. The sum of the areas of the bolts should not be less than one-fifth the area of the beam, when a longitudinal strain is to be borne. No joint should be used in which shrinking or expansion can tend to tear the timbers. No joint can be made so strong as the timber itself. When two pieces of timber are connected so that the joint runs parallel with the fibres of both, it is called a *longitudinal joint;* but when the place of the joint is at right angles to the fibres of both, an *abutting joint*.

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A very short tenon is called a *stub tenon*. When a second minor tenon is made projecting from the principal tenon it is called a *tusk tenon*.

For light joiner's work, similar methods of framing are used, only adapted to the work—to boards generally instead of beams; thus, for example, the mortise and tenon joint, made oblong instead of square, is used in framing doors, shutters, drawing-boards, or any other kind of extended superficial work liable to warping. An outside frame or skeleton is made with a panel or panels in the middle, and each piece of the frame has the grain at right angles to the piece into which it is mortised, in order that they shall eventually correct the warping.

Dove-tailing is extensively used for connecting boards at right or other angles as in making boxes, drawers, &c. Common dovetailing is usually glued. Nails or pins and glue are used with the mitre and other notched joints.

Boards may be united at their edges to form an extended surface, as a flat plank partition, &c., either by simple gluing of the shot edges, by a *rebate* or by a ploughed groove and a corresponding projection. The rebate is cut by means of a rebating plane. The groove, a sort of extended mortise, is cut by a plane with a projecting iron called the *plough*.

In all cases where glue is used in joints, it should be applied to both surfaces, which should be rubbed and pressed together until nearly all the glue is forced out, then kept pressed by a cramp or weights. White lead is used for outside joints.

Special departments of this subject, such as Roofs, Staircases, &c., will be treated under their respective heads.

CA'RPETS. Woven C., such as are now so common in this country, were first used in the east, where the custom of sitting cross-legged on the floor still renders them especially useful. Our rude forefathers covered the floors of their houses with rushes, hair, or straw; and in Norwegian farm-houses, where so many of our ancient customs still exist, the floor of the best room is commonly strewed with juniper-twigs. The first step towards a woven carpet was made by plaiting rushes to form a matting.

The principal varieties of C. now in use are the Turkey, the Axminster, the Brussels, the Wilton, the Venetian, the Dutch, the Kidderminster or Scotch, Whytock's Tapestry and Velvet Pile, and the Printed Felt Carpet.

The real Turkey carpet is made in one piece; those manufactured for the orientals are usually too small for use in this country. The patterns consist merely of curved and angular stripe, of variegated but dark and unobtrusive colors. The warp is of strong linen or cotton, to which bunches or tufts of colored worsted are tied according to the pattern, a drawing of which is placed before the weaver to copy. The surface is afterwards shorn level. Rugs are made in a similar manner; the colored worsteds are tied very rapidly by young girls.

The *Axminster Carpet* is merely the English-made Turkey carpet, formerly manufactured as above at Axminster, in Devonshire. They are usually made to order, and of the size required for the room; from the tedious nature of the process of manufacture, they are very expensive.

Templeton's Patent Axminster Carpet is a very beautiful fabric, very much resembling that from which it derives its name, but it is wrought on the chenille principle.

The *Brussels Carpet* is a mixture of linen and worsted, but, like the Turkey carpet, the worsted only is shewn on the upper surface. The basis or cloth is a coarse linen fabric, and between the upper and under threads of the weft, several (usually five) worsted threads of different colors are firmly bound in. The pattern is produced by drawing to the surface, between each reticulation of the cloth basis, a portion of the worsted thread of the color required at that spot to produce the pattern; these updrawn portions are formed into loops, by being turned over wires, which are afterwards withdrawn, and the loops thus left standing above the basis form the figured surface of the carpet. The machinery and processes by which this arrangement is produced are rather complex, and require to be seen to be fully understood.

The *Wilton Carpet* is made like the Brussels, but the wire has a groove in the upper surface, and instead of being drawn out, it is liberated by passing a sharp knife through the worsted loop into this groove, and thus making a velvet pile surface instead of the looped thread.

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The *Venetian Carpet* is produced in a common loom, and the pattern is all in the warp, which alone is visible, as it encloses the weft between its upper and under surfaces. The patterns are generally checks or stripes; the latter are chiefly used for stair carpets.

The *Dutch Carpet* is a coarser and cheaper variety of plain Venetian, sometimes made wholly of hemp, or of a mixture of coarse wool and cow-hair.

The *Kidderminster* or *Scotch Carpet* has usually a worsted warp and woollen weft, and the pattern is made by the combination of the colors of each. Three-ply C. this kind are made especially in Kilmarnock. This is the most durable of the moderate-priced C., the patterns are not so brilliant as those of the Brussels or the Tapestry, but, being ingrained and woolen throughout, they retain their character until worn through. This, and the three immediately preceding descriptions of carpet, exhibit their patterns nearly similar on both sides, and are therefore reversible.

Whytock's Tapestry and Velvet Pile Carpet, as it is now frequently called, is becoming very extensively used as a cheap substitute for Brussels and Wilton, which it is made to resemble very closely in the brilliancy and variety of pattern. The manufacture of this carpet is very curious and ingenious. Instead of five colored yarns, only one of which is drawn to the surface at any one place, while the other four remain buried between the upper and under threads of the cloth basis, a single colored yarn is used, and the variety of color produced by dyeing it of various colors at intervals of its length. The yarn is coiled upon a drum, and printed by means of rollers in such a manner that when the threads that encompass the roller shall be uncoiled and laid in lines side by side, they shall present an elongated printing of the pattern, so that a rose, for example, the outline of which should be nearly circular, will be an oval, with length equal to four times its breadth. When, however, the thread is looped over the wire, four inches of yarn being used for an inch of the carpet pattern, this elongation is exactly compensated, and the rose appears in its proper proportions. The machinery required for this is, of course, much simpler than that for the Brussels, only one yarn having to be looped, and that always in the same manner.

The *Printed Felt C.* are, as the name implies, simply made by printing colors on felt. These are chiefly used for bedroom carpets.

A very beautiful fabric has also been introduced, called the *Patent Wool Mosaic*, formed by cementing a velvet pile upon plain cloth. It is used for rugs, &c. The pile is formed by stretching lengths of woollen yarn between plates of finely perforated zinc, placed several yards apart, the colors of the threads being arranged so that their ends shall shew the pattern. The mass of yarn is then enclosed in a case, open at both ends, and compressed without deranging the fibres; and by means of a piston or ram at one end, a portion of this mass of yarn is forced forwards, the ends thus projecting are glued to the plain cloth, and when dried, are cut off to the length required for the pile. In this manner, several hundred slices are made from one setting of the yarn mosaic, and as many rugs produced.

CA'RPI, a town of Northern Italy, 10 miles north of the city of Modena. It is surrounded by walls, defended by a citadel, has a cathedral, and manufactures of silk and straw hats. Pop. 5000.—CARPI is also the name of a town of Venetia, in the province of Verona, 28 miles south-east of Verona, celebrated for the victory obtained here by Prince Eugene over the French in 1701. Pop. 1200.

CARPINI, Johannes de Plano, a celebrated Franciscan monk, born in Capitanata, Naples, about 1210; was one of the six friars selected by Pope Innocent IV. to proceed to the court of the emperor of the Mongols, whose warlike advances in 1246 threw Christendom into consternation, in order to pacify the terrible nomadic warriors, and, if possible, convert them to Christianity. The mission, accomplished under dreadful hardships, though without results so far as its main objects were concerned, was nevertheless far from unfruitful. Prior to this, the most monstrous fables had prevailed regarding the Tatars; and C.'s narrative, which gave a truthful and striking picture of their numbers, character, and civilisation, was the first to bring these myths into discredit. In this book he also argued, with great good sense, for a union among Christian princes, as the only means of resisting those fierce hordes in their progress westward. As a book of travels, its accuracy has been attested by modern travellers. Hakluyt copied most of this work, at second-hand,

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into his first volume of "Navigations and Discoveries." The date of C.'s death is not certainly known.

CARPI'NO, a town of Southern Italy, in the province of Foggia, 22 miles north-east of San Severo, with a population of about 6000.

CARPO'CRATES, or Carpocras, flourished under Hadrian (130 A.D.) at Alexandria, where he founded the Gnostic sect of Carpocratians. According to him, the essence of true religion consisted in the union of the soul with the Monas or highest God, by means of contemplation, which elevated it above the superstitions of the popular faith, and liberated it from the necessity of submitting to the common laws of society. He only is to be reckoned wise who attains to this. Among those who have done so, are Jesus, Pythagoras, Plato, and Aristotle. The cosmogony of C. was of the usual Gnostic character, the central peculiarity of which was the belief that the worlds were created by angels. C. also held the doctrine of the transmigration of souls. His followers existed down to the 6th century. Whether or not they were guilty of abominations ascribed to them, is more than we can positively affirm; our only information concerning them being derived from *orthodox* writers, who were in the habit of slandering heretics.

CA'RPOLITES, a generic term applied to fossil fruits, which, in the present state of our knowledge, it is impossible to refer more precisely to their place in the vegetable kingdom. Of 100 species described, 70 belong to the carboniferous system.

CA'RPUS, CARPAL BONES. See HAND, FOOT, SKELETON.

CARRA'CA, La, a town of Andalusia, Spain, one of the chief naval arsenals of the kingdom, is situated 4 miles east-south-east of Cadiz. It has been completely isolated from the mainland by artificial means; and so low is its situation, that it was necessary to erect the buildings on piles. It is defended by four forts, and is altogether very complete as an arsenal.

CA'RRAGEEN, often incorrectly called C. Moss, or Irish Moss, a sea-weed (natural order, *Algæ*; sub-order, *Ceramiaceæ*), or rather several species of sea-weed, now used to a considerable extent both medicinally and as an article of food. The name C. is originally Irish; and the use of these sea-weeds appears to have been entirely confined to the peasantry of the coast of Ireland, until about thirty years since they were recommended to general notice, and their medicinal virtues proclaimed by Mr Todhunter, of Dublin. They are, however, found on the rocky sea-shores of most parts of Europe, and of the eastern coasts of North America. The species which principally constitute the C. of commerce is *Chondrus crispus*, of which the varieties are remarkably numerous. It is 2—12 inches long, branched by repeated forking, cartilaginous, flexible, reddish-brown. *C. mamillosus* also frequently occurs. C., after being collected, is washed, bleached by exposure to the sun, dried, and packed up for the market. Its composition is as follows:

Vegetable jelly (carrageenin)	79·1
Mucus	9·5
Two resins	0·7
Ash	2·0
Fibre and water	8·7
	100.0

When treated for ten minutes with cold water, in the proportion of half an ounce of C. to three pints of water, and then boiled and strained, it yields, with or without spices, a very pleasant drink. With a larger proportion of C., a thickish liquid or *mucilage* is obtained; and on boiling down this strong decoction, and cooling, a stiff *jelly* is procured. Milk may be employed, instead of water, in the preparation of the various decoctions; and with the stronger one, along with sugar and spices, when thrown into a mould, a kind of *blanc mange* is obtained. C. is valued on account of its emollient and demulcent properties, and is likely to be found useful in most of those cases in which iodine might be exhibited; but its value seems to depend not a little on its being at once nutritious, a pleasant article of food, and easy of digestion. See GELATINE. It has been much recommended in pulmonary consumption. In some parts of Ireland, C. boiled with water (mucilage) is used instead of size for mixing with the more common colors in house-painting.

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CARRAPA'TO, a species of Tick (q. v.) of the genus *Ixodes*, which infests dry bushy places in the interior of Brazil, hanging in clusters of many hundreds on very slender twigs, and ready to attach itself to any quadrupod or man that passes, instantly burying its beak in the skin, from which it cannot be detached without considerable force. Horses and oxen suffer very much from the attacks of the C., of which in dry seasons the numbers are so great, that whole herds of cattle are destroyed by the exhaustion which they produce.

CARRA'RA, a town of Northern Italy, 60 miles south-west of Modena. It is situated on the Avenza, near its mouth in the Mediterranean, and is surrounded by the marble hills which have made its celebrity. Many of the principal buildings are wholly or partially constructed of the inferior kinds of white marble. There are upwards of 30 marble quarries in the vicinity of the town, but not more than 6 or 7 furnish the marble used for statuary. Extensive works, fitted up with English machinery for sawing the marble, have been established near the town, in which are several shops for the sale of marble ornaments. Many foreign artists have set up their studios here, in order to save the expense which the export of the marble in its rough state entails. C. has a fine collegiate church of the 13th and 15th centuries, with some good sculptures, an academy of fine arts, and a pop. in 1872, of 23,827. The quarries have been worked for more than 2000 years, and yield £75,000 worth of marble yearly.

The famous CARRARA MARBLE is a white saccharine limestone, which derives its value to the sculptor from its texture and purity. It was formerly supposed to belong to the Primitive rocks, but is now known to be a limestone of the Oolitic period, highly altered by plutonic action.

CARREL, Armand, a celebrated French publicist and republican leader, was born at Rouen in 1800, and was educated in the military school of St Cyr. After serving for some years in the army, he went to Paris, and devoted his attention to political and historical studies. In 1830, in connection with Thiers and Mignet, he became editor of the "National," the most spirited and able of the journals opposed to the government of Charles X. C.'s colleagues being employed by the new government, he was left to conduct the "National" himself, which he did with a spirit and a freedom such as had not been witnessed in France for a long time—which on more than one occasion checked the arbitrary power government attempted to exercise, and gained for him the high admiration and esteem of the popular party. Government prosecutions of course followed his outspokenness, and heavy fines were decreed against him; but these were paid by public subscription, and each conviction only made his journal more famous. C., however, dreaded revolution as much as he hated despotism, and had no sympathy with many of those who looked up to him as a leader. Provoked into a duel with Emile de Girardin, by an attack on his personal character, C. was mortally wounded, and died July 24, 1836. His funeral was attended by many of the most distinguished men in France.

CARRIAGE. See COACH, CART, WAGON.

CA'RRIAGE DEPARTMENT, Royal, at Woolwich, is one of the great national manufacturing establishments maintained for warlike armaments—its duty being the construction of gun-carriages, for army and navy, military wagons, and vehicles of all kinds, and the joinery of the army generally. The department was organised as a distinct establishment in 1803, and has been undergoing gradual enlargement ever since. Since the recent introduction of iron carriages for heavy guns, the department has had a new section added for ironwork. Until 1855, the Board of Ordnance had the direction of this department, but in that year it passed under the direct control of the Secretary for War, who, since 1869, administers it through the Surveyor-general of the Ordnance. The works, store-rooms, and yards are of vast size, often employing from 2000 to 3000 hands. There are many steam-engines in various parts of the establishment; and the iron and wood cutting and shaping machines are of the highest order of excellence. The internal communications are carried on by locomotives on a tramway of 18 inches gauge. See GUN-CARRIAGE.

CARRICAL, or Karikal, a French port within the limits of Tanjore, a district of the presidency of Madras. It stands in lat. 10° 55' n., and long. 79° 53' e., on the estuary of a small branch of the Cauvery, a tributary of the Bay of Bengal. C. is accessible from the sea only after the periodical rains, and then only for coasting

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craft. The town and territory contain 63 square miles, and about 50,000 inhabitants. The settlement, originally ceded to France by a native grant in 1759, and subsequently subdued by the British, was restored in 1814, on condition of being neither fortified nor garrisoned.

CARRICKFE'RGUS, a seaport town of Ireland, is situated on the Lough of Belfast, about 10 miles distant from the town of that name. Though locally within the county of Antrim, it forms a county of itself. C. extends nearly a mile along the north-western shore of the Lough. Its chief feature is its castle, a fine picturesque object, supposed to have been erected by De Courcy in the 12th century. It is situated on a rock about 30 feet high, projecting boldly into the sea, by which it is surrounded on three sides. The ballium or keep is 90 feet in height. From the top of the keep a splendid view is obtained, extending, in a clear atmosphere, to the Mourne Mountains and the Scotch coast. The castle contains a barrack, bomb-proof magazine, and ordnance store-rooms; and for many years, 22 pieces of ordnance, 12-pounders, were mounted on the works. A total change has, however, been made in the defence of the castle, and cannon of a very large calibre are now mounted, in order to command the entrance of the Lough. In 1575, a wall 16 feet high and 7 thick, with 7 bastions, to surround the town, was commenced, and completed in the year 1608; a considerable portion of the wall is still standing, and one of the four entrance-gates. On the 14th June 1690, King William III. landed here with his army, twelve days before the battle of the Boyne. The rock on which the king stepped on landing is at the end of the quay, projecting from it, and still forming the landing-place. In 1760, Commodore Thurot captured the castle, but on the approach of troops from Belfast, was forced to abandon it. The parish church, said to have been founded in the year 1164 on the site of a pagan temple, is a fine old building, dedicated to St Nicholas. There are several other churches and chapels in the town and several good day and Sunday schools in connection with the religious bodies, and a fine model school has been erected by the National Board. There is a Literary and Scientific Society, with reading-room, library, and museum. The fishery of the bay, which is famous for oysters of an unusual size, employs a good number of the inhabitants. There are four spinning-mills, one for weaving linen, one bleaching establishment, a starch manufactory and a tan-yard. A market is held every Monday and Saturday, and a fair twice a year. Pop. (1871) 9397. The town returns one member to parliament. There are several barrows or tumuli in the vicinity. C. is connected by railway with Belfast, Portrush, and Larne. A few years since, a shaft was opened by the Marquis of Downshire, in the hope of finding coal—without success; but salt of a superior quality, and in great abundance, was found. A company has been formed, and are working the mine. The length and breadth of the county are nearly equal—about 5 statute miles.

CA'RRICK-ON-SUIR, a town of Tipperary, situated, as its name implies, on the Suir, which is navigable at this point, 12 miles east of Clonmel, in the midst of very fine scenery. Pop. (1871) 7792. C. was formerly celebrated for its woollen manufacture, which has recently been considerably revived, and there are also linen and flax factories. It exports much agricultural produce. The town has recently much improved. C. became a place of note soon after the Norman Conquest. There are the remains of a castle built in 1309, on the site of an old priory of the Knights of St John of Jerusalem.

CARRIER, Jean Baptiste, one of the most infamous and blood-thirsty members of the French National Convention, was born at the village of Yolai, near Aurillac, in Haut-Auvergne, in 1756. Entering the National Convention in 1792, he took an active part in the formation of the Revolutionary Tribunal, voted for the death of the king, demanded the arrest of the Duke of Orleans, and assisted in the overthrow of the Girondists. At Nantes, whither he was sent on a mission against the moderates, in October 1793, he found ample means for indulging his insatiable thirst for human blood. The utter defeat of the Vendeans had filled the prisons with captives, and C. proposed and carried a resolution for murdering the unhappy prisoners *en masse*. Accordingly, on November 15, he compelled 94 priests to embark in a vessel, under pretence of deportation, and during the night drowned the whole of them, by having the ship scuttled. Another of these *Noyades*, as they were called, in which 138 persons were sacrificed, took place soon after, and they were repeated to

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the number of 25, their perpetrators facetiously terming them "vertical deportations." Other cruelties C. committed here. Men and women were tied together feet and hands, and thrown into the Loire; and this was called *mariage republicain* (republican marriage). With such recklessness were these murders committed, that, in one instance, a number of foreign war-prisoners were drowned by mistake. The water of the Loire was so poisoned by corpses, that its use for drinking and cooking was prohibited. 50 political prisoners were shot, as in a battue, on the bridge near Nantes. Even Robespierre was offended by these enormities, and recalled C., who boldly justified his own conduct before the Convention. The fall of Robespierre was, however, soon followed by outcries against Carrier: judgement was decreed against him, and he perished under the guillotine, December 16, 1794—dying with the protestation that, in all his cruelties, he had acted according to orders, and as a true republican patriot.

CARRIER PIGEON, a variety of the domestic Pigeon (q. v.), remarkable for the degree in which it possesses the instinct and power of returning from a distance to its accustomed home; and which has been, therefore, much employed to convey letters from one place to another. In Eastern countries, where such messengers are most frequently employed, it is the practice to bathe the pigeon's feet in vinegar to keep them cool, and to prevent it from alighting in quest of water, by which the letter might sustain injury. Pigeons intended for this use must be brought from the place to which they are to return, within a short period, not exceeding a fortnight of their being let loose, and at a time when they have young in their nest; the remarkable fecundity of the C. P. affording particular facilities for its employment in this way. The bird is also kept in the dark and without food, for at least eight hours before being let loose. The instinct by which it is guided, like most other instincts, has received no sufficient explanation. That it recognizes objects by sight, and so directs its course, is nothing more than a conjecture, and as such, is only very partially supported by the fact of the great power of vision which these birds, in common with so many others, are known to possess, and by that of the C. P., on being let loose, immediately rising spirally to a great height in the air, as if to obtain opportunity for the exercise of this power. The C. P. has probably been more used in the Turkish dominions than in any other part of the world, and during the siege of Paris in 1871, it safely conveyed many important messages. Its rate of flight is not less than thirty miles an hour, and it has been known to pass over great distances still more rapidly. The variety generally described as the C. P. (*Columba tabellaria* of Linnæus, *C. Turcica* of some authors, but not generally regarded by naturalists as a distinct species), is of remarkably large size, about fifteen inches in length from the point of the bill to the extremity of the tail, and has the cere very large and caruncultated, the eyes surrounded with a broad circle of naked red skin, and the wings reaching nearly to the extremity of the tail. There is, however, a smaller variety, which is said to be superior to it, and which has not the caruncultated cere, nor the broad circle round the eye. Carrier pigeons are trained by being conveyed, when young, to short distances of a few miles from home and then let loose, the distance being gradually increased; and this training is said to render them much more secure as messengers.

CA'RRIERS, a class of persons who, in various forms, by land and sea, undertake the carrying of goods, particularly articles of commerce. In all countries aspiring to commercial intercourse, the CARRYING TRADE, as it is called, has been less or more developed. The method of carrying in Arabia, Persia, and some other countries in the east has, till the present time, been chiefly by means of the camel, an animal of great value, on account of its strength, patience, and power of endurance. See CAMEL. In England and Scotland, previous to the general use of wheel-carriages, goods were carried on pack-horses, as is still practised in some parts of Spain with mules. See PACK-HORSE, also MULE. After the pack-horse came the one-horse cart and the four-wheeled wagon, as engines of land-conveyance. Carrying with one-horse carts settled down as a universal practice in Scotland, where it is still conducted in all districts not traversed by railways. The Scotch C., winding their way by roads over hill and dale, at the rate of about 20 miles a day, have ever been a respectable and useful body of men, exceedingly trustworthy, and moderate in their charges. In connection with Edinburgh, Glasgow, and other centres of

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traffic, they travel to and from provincial towns for the most part once a week on certain days, so that their arrival at any particular place may be reckoned on with great exactness. In England, the employing of wagons for carrying goods in connection with the metropolis and provincial towns is now of old date. These carriers' wagons, greatly limited in their range by the introduction of canals and railways, are still to be seen in some of the rural districts. A wagon of this kind is provided with our broad huge wheels; and being a heavy and clumsy engine of conveyance, is drawn by four horses, though when roads were bad in old times, six horses were not unusual. The driver ordinarily rode on a pony alongside the vehicle; now he more frequently walks, carrying a long whip. The wagon has a hooped top with movable covering: and the hinder part has always been left vacant for the use of passengers, who are necessarily huddled together on straw. Travelling in the "tail of the wagon" is now entirely gone, or nearly so; but with all its rude inconveniences, it was common till past the middle of the 18th c., and has afforded scope for some of the most grotesque descriptions of Fielding and Smollett. The tedious process of carriage by these wagons largely increased the prices of goods, and retarded the growth of commerce. The first modification in the carrying trade took place by means of inland navigation, to which reference has already been made. See CANAL. The conveyance of cotton goods from Lancashire, of earthenware from Staffordshire, of metal goods from Birmingham, of salt from Cheshire, &c., became much more easy than before, owing to the large quantity which could be packed in each barge, and to the great amount of work done by each horse. The chief owners of the old wagons became, in time, the chief owners of the canal-boats; they paid rates or tolls to the canal companies. The celebrated English firm of Pickford & Co. has been for many generations, and still is, at the head of the goods carrying trade.

When railways were established, a great struggle ensued; the owners of the road-wagons and canal-barges had a formidable competition. They wisely accommodated themselves to a state of things which they could not prevent, and added the trade of railway goods C. to their former business. Three systems were tried: 1. The company purchased road-wagons or vans, collected goods at the various towns, conveyed them by railway, and then distributed them at their several destinations. 2. The company confined their attention to the mere conveyance on their railway, leaving the collection and delivery to the ordinary carriers. 3. The company combined both systems, conveying on the railway everything that offered, and competing with the C. for the road-traffic. During the greater portion of the period in which the railway system has been in operation, the second of the above three plans has been adopted more extensively than either of the others. Taking as examples the greatest railway company and the greatest carrying firm, Messrs Pickford had warehouses or depôts at all the principal towns where the London and North-western Railway had stations. The merchants and manufacturers were customers, not to the company, but to the firm, for the conveyance of merchandise. Messrs Pickford employed their own wagons and horses, clerks and porters, in collecting and delivering goods, and paid to the company so much per ton for the conveyance along the railway, the toll varying according to the nature of the goods and the distance run. There were seldom any quarrels or disputes under this system. The carrier was responsible to the customer from first to last for the safety of the merchandise; and he had a claim against the company for any injury while the merchandise was on the railway. Under the third system, disputes were much more frequent. The companies were bound by law to carry goods for all persons at certain tolls; but when they became road C. as well, they competed with the ordinary C. in a way which the latter could barely contend against. The Great Western Railway has been unfavorably distinguished for jealousies and law-suits between the company and the carriers.

At the present time, the tendency is for the companies to take the responsibility of the whole conveyance, the C. acting as their agents, if willing so to do, or else endeavoring to maintain a fair competition. One of the greatest of the companies, the Midland, have in this way become C. on their own account, in order to obtain a share of the profit which accrues from road-traffic. The goods-vans traversing the streets of the metropolis, and other great towns, are now more frequently inscribed with the names of railway companies than with those of private carriers.

The goods-depôts of the several railways are scenes of great activity during the

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night; for it is then that the arrival-trains are mostly unpacked, and the departure-trains mostly made up. During the day, vans are collecting goods from manufactories and warehouses; these goods are sorted at the dépôts, and are, when evening comes on, distributed among different trains, according to the part of the country to which they are to be conveyed. On the other hand, goods-trains arriving during the evening and night are unpacked, the goods classified according to districts, and sent out for delivery by road-vans on the following day.

The four-horse broad-wheel wagons, as already said, have almost disappeared from English roads; vans of lighter construction sufficing to convey merchandise from and to the various railway stations. Canals still command a trade, but it is chiefly in coal, stone, lime, ores, slate, bricks, and other articles very bulky in proportion to their value. The conveyance of manufactured goods has, for the most part, passed over to the railways.

In towns, there are C. whose business is confined wholly to short distances. Taking the metropolis as an example, there are C. residing in all the villages and hamlets round about, each possessing one or more single-horse covered carts. Every morning the cart, containing miscellaneous articles collected in the village or hamlet, goes to London, and delivers each article at the particular house or establishment to which it is addressed. When thus emptied it receives a supply of packages or other articles going *from* London to the suburbs, and makes its return-journey in the evening. The plan is cheap and convenient, and does not seem likely to be supplanted by any other; for no amount of railway extension would wholly accommodate *short* traffic. For the metropolis more strictly, however, an excellent system has been established by the "London Parcels Delivery Company." Two or three times a day, parcels are conveyed from receiving-houses all over the metropolis to a central dépôt near Fetter Lane, there sorted, and sent out again for delivery. The metropolis, out to a wide distance, is separated into districts, and one or more carts, filled with parcels, are sent to each district at certain hours of the day. The speed is rapid, the times are punctual, and the service in general well conducted. The suburban C. have arranged among themselves a sort of central dépôt or "house of call," in the Old Bailey, for the exchange of traffic; but their system is not so well organised as that of the company just named.

The progress of improvement in the English CARRYING TRADE is a type of the advances similarly made in the United States, where canals, railways, and coasting steam-vessels have generally superseded the old tedious methods of conveyance; and it is chiefly on the long and almost trackless routes to the shores of the Pacific that are now seen the old processes of carriage by pack-mules and horses and bullock-wagons, the cost of transit by these means being very great.

The term CARRYING TRADE has latterly been applied more specially to all kinds of conveyance of merchandise by sea, whether across the ocean or along the coast. In this broad view, it, in reality, involves the whole question of mercantile marine, British and foreign.

CARRIERS, LAW RESPECTING. A carrier, in Law, is one who offers to the public to convey passengers, or goods, from one place to another, for hire. The offer must be general—for a private person who contracts with another for carriage, is not a carrier in the legal sense, and does not incur the peculiar responsibilities which, in almost every country, it has been found expedient to attach to the occupation of a public or common carrier. Carriage, in law, is thus a peculiar modification of the contract of hiring. In Rome, the responsibilities of carriers by water were regulated by a prætorian edict, which was applicable also to innkeepers and stablers (Nautæ, Caupones, Stabularii, Dig.; lib. iv. t. 9); and from that edict the law of carriage in modern Europe has been mainly borrowed, sometimes directly, as in Scotland, sometimes indirectly, as in England. The ground on which the edict increased the responsibilities attaching to an ordinary contract of hiring was, that the persons whom it enumerated were under peculiar temptations to consort, either personally or through their servants, with thieves and robbers, without the connection being such as to admit of proof; and that the public safety consequently required that they should be held responsible for whatever had been intrusted to them, till its safe delivery at the place to which they had undertaken to convey it. This responsibility in our own law extends not only to the acts of the carrier's servants, but also to those of the other guests in

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an inn, or the other passengers in a conveyance. The only exception to this liability at common law is in the case of loss arising from the act of God (q. v.) or the Queen's enemies—i. e., the fury of the elements, or war. But there are several statutory limitations. The liability for gold and silver, and articles of unusual value, is restricted to £10, unless the extra value has been previously stated and paid for as insurance against the greater risk (11 Geo. IV. and 1. Will. IV. c. 68, and 17 and 18 Vict. c. 31); and the proof of value is laid on the person claiming compensation. But the last-mentioned act, commonly called the Railway and Traffic Act of 1856, provides, on the other hand, that the company shall be liable for neglect or default in the carriage of goods, animals, &c.; notwithstanding any notice or condition or declaration made by the company, for the purpose of limiting their liability. The decisions of the courts have also somewhat limited the universal responsibility of the carrier. For example, it has been decided that he is not liable *qua* C. (and the same applies to an inn-keeper), for money taken from the pockets of the traveller; but that, if the money has been taken from the pockets of clothes which have been stolen, or from trunks which have been broken into, his responsibility comes into operation.

Under C. are included carters and porters, who offer themselves for hire, to carry goods from one part of a city to another. Whether the same be the case with hackney-coachmen, is more doubtful; though, from the extent to which they are now employed in the transport of luggage, there seems no sound reason for an exemption in their case. Wharfingers and warehousemen are liable only under the special contracts into which they may have entered, or in accordance with mercantile usage. In England, it has been decided that lodging-house keepers are in a different position from carriers and innkeepers, on the ground that they do not profess to entertain all-comers, or to receive their goods. C. are liable to make good to the owners of goods intrusted to them all losses arising from accidental fire. This rule was introduced into Scotland by the Mercantile Law Amendment Act of 1856. Carriers have a lien upon the goods they have carried for payment of the carriage only. The lien is, however, restricted to the particular goods to which the carriage refers, and ceases on possession of them having been given up. It does not cover any account or balance due either by the sender or consignee to the carrier.

CA'RRION CROW. See CROW.—C. C., also called *Black Vulture*, is not in America, as in Britain, the name of a species of crow, but of one of the Vulture family. See VULTURE.

CARRION FLOWERS, a name which, on account of their smell resembling that of putrid meat, has been given to the flowers of many species of *Stapelia*. The genus *Stapelia* belongs to the natural order *Asclepiadeæ*, and is remarkable for the excessive development of the cellular tissue of the stem and reduction of that of the leaves, resulting in a general aspect like that of the *Cactus* family. The species are natives of the Cape of Good Hope. The flowers are often large, and not devoid of beauty, but the carrion stench is very strong. It is not yet known to what chemical substance it is owing.

CA'RRON, a village in Stirlingshire, Scotland, on the right bank of the Carron Water, 3 miles east-north-east of Falkirk. It is celebrated for its ironworks, which are among the largest of the kind in Britain. The works were established in 1760; and are carried on by a company, who employ a great number of men. Pop. (1871) 1093.

CARRON OIL. See BURNS.

CARRONA'DES are short iron guns, invented by Mr. Gascoigne, and named after the Carron Iron Works in Scotland, where they were first made. They are lighter than ordinary guns, and have a chamber for powder, like mortars. They were made standard navy guns in 1779, to be carried on the poop, forecastle, and upper works. Being manageable by a smaller number of hands than guns, and being very useful in close engagements, they were held in much favor during the great war: the seamen called them "smashers." A 68-pounder carronade weighed not much more than half as much as the 42-pounder gun in use in 1779. They range from 68-pounders down to 6-pounders. The denominations, weights, lengths, calibre, &c., of the chief varieties of carronade are noticed under CANNON.

Some C. are made shorter with a given bore. C. are but little used, except by

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the English and French. Though valuable at close quarters, they are no match for long guns at a distance; and therefore a ship armed only with C. would fare badly in a general action. In recent years, C. have to a considerable extent been replaced in the English navy by howitzers, long guns, and shell guns.

CARROT (*Daucus*), a genus of plants of the natural order *Umbelliferæ*. They are mostly natives of the countries surrounding the Mediterranean Sea. The Common C. (*D. Carota*), is a biennial plant, common in Britain and most parts of Europe, also in the Caucasus; and is universally cultivated not only in Europe and the European colonies, but in China, Cochin China, &c., for the sake of its root. The root of the wild plant is slender, woody, and of a very strong flavor; that of the cultivated variety is much thicker and more fleshy, much milder in its flavor and qualities, generally red, but sometimes orange or yellowish white. The subvarieties in cultivation are also distinguished by their form—some being longer and more tapering than others—by their size, and by the duration of their growth; the *early* kinds being also comparatively small, and almost exclusively cultivated in gardens for culinary use, whilst the larger and *late* kinds are often also grown in fields for feeding cattle. The field cultivation of the C. is carried on to a much greater extent in some parts of France, Germany, and Belgium, than in Britain; but it is increasing in Britain. The C. appears to have been cultivated at an early period in Flanders and Germany, and to have been introduced into the gardens of England in the beginning of the 16th century. In the reign of Charles I., ladies wore C. leaves as an ornament instead of feathers; and the beauty of the leaves is still occasionally acknowledged by placing a root, or the upper portion of one, in water, that it may throw out young leaves to adorn apartments in winter. The C. prefers a light and rather sandy soil, and often succeeds very well on a peat soil. It is very liable to the attacks of the larva of the Crane Fly (q. v.), by which the greater part of a crop is sometimes destroyed when the young roots are about the thickness of a quill; on which account, in gardens where there is particular reason to apprehend danger from this enemy, it is the practice to make a number of successive sowings, some of which may probably escape. As an article of food, C. contains a large amount of what are called heat producing compounds, with a small proportion of flesh-forming matter. It consists essentially of starch, sugar, and albumen, along with a volatile oil, which communicates a flavor to many dyspeptics very unpleasant. The following is the composition of dried carrot:

Starch and sugar	93·71
Albumen	4·35
Red neutral substance (carotin)	0·34
Fixed and volatile oils	1·00
Ash	0·60
	100·00

C. is easy of digestion, and gently laxative. Boiled C. is used as a poultice for foul ulcers and other sores, and as a vermifuge. Grated C. forms an agreeable cooling, but also stimulant application. A sirup is prepared from carrots; and when cut into small pieces and roasted, they are occasionally used in Germany as a substitute for coffee. A strong ardent spirit is distilled from them in some parts of Europe, 10 lbs. of carrots yielding about half a pint. C. seeds are employed as a diuretic, also as a carminative and stimulant; those of the wild C. being preferred.—Besides the crane fly, already noticed, carrots have numerous other insect enemies. One of the most troublesome is the CARROT FLY (*Psila rosæ*), a small dipterous fly, the larvæ of which, by eating away the surface of the root, cause what is commonly known as *rust* in carrots, and prepare them for the further operations of millepedes and other destroyers. The larvæ of several species of moth (*Depressaria*) are very injurious to them when in flower and seed. An aphis (*A. dauci*) often kills the young plants.

CARROU'SEL (Fr.), a species of knightly exercise, which, down even to the beginning of the 18th c., was very common in all the courts of Europe. C. was a kind of imitation of the tournament, and for a time after the discontinuance of the latter seems

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to have supplied its place. The dresses, for the most part, were those of the knights of former times, and the combatants, or rather competitors, were divided into two parties, usually according to their different nationalities. One of the favorite exercises in France consisted in running at the pasteboard head of a Moor or Turk with a lance, cutting it down with a sword, or firing at it with a pistol. Another of these tests of skill and horsmanship, if not of courage, consisted in carrying off a whole line of rings, which were suspended for the purpose. The C. in France was not known earlier than the reign of Henry IV.; but it had existed for some little time previously in Italy. There were brilliant carrousels under Louis XIII., and two celebrated ones were given in honor of Mademoiselle de la Vallière—the one at Paris in 1662, the other at Versailles in 1664. The place where the first of these fêtes was held, has ever since been called the Place du Carrousel. A revival of the C. was attempted at Berlin in 1750; and in 1828 the Cavalry School at Saumur held one in honor of Madame la Duchesse de Berry. The so-called Eglinton Tournament—an entertainment given some years ago by the chivalrous Earl of Eglinton—was in reality a carrousel.

CARSE is a term applied in Scotland to low lands adjoining rivers. The word is of uncertain origin. In Stirlingshire it is restricted in its sense to the level alluvial soils which are only a few feet above the river Forth. In Perthshire, it also applies to the whole of the slightly undulating lands to the north of the Tay, which form the C. of Gowrie. C. soils usually consist of argillaceous deposits, which produce crops of great luxuriance, although there are some which consist of hungry and barren clays. The richest of them are of a hazel color, and become friable when exposed to the action of frost; the poorest, on the other hand, are of a yellow color, containing little vegetable matter to render them amenable to cultivation. The best kinds of C. soils, are generally farmed on the six-course shift—1. Grass; 2. Oats; 3. Beans; 4. Wheat; 5. Potatoes; 6. Turnips or Fallow. Large crops of grass are grown when the clover-plant catches. It is mostly made into hay, and the aftermath is used for soiling horses and cattle in the straw-yards. The land is seldom pastured, as the feet of animals trample and destroy the grasses, when the weather is wet. The oat-crop is more uncertain on the carses, but in favorable years, the yield is large, and the quality of the grain is excellent. Beans are very successfully grown, indeed the best of the C. soils are the best bean-soils in Scotland. Where the land is rich, and not too stiff, the potato is sometimes largely grown. On the poorest description of the C. soils, the potato does not thrive. Wheat can be grown in closer succession on the C. lands, than on any other description of land with the same expenditure of manure. A large stud of horses are required on C. lands, to enable the farmers to prepare the land for the various crops, at the moment when the season serves. A small portion of the land is still usually summer-fallowed, as it is found that it cannot be kept thoroughly clean by green crops in rainy seasons.

CARSTAIRS, William, a distinguished political and ecclesiastical character of the 17th c., who took a very active part in bringing about the Revolution of 1688, was born at Catcart near Glasgow, February 11, 1649. He was educated at the village school of Ormiston, in East Lothian, and subsequently at the university of Edinburgh, where he displayed a remarkable aptitude for learning. In his 24th year, Scotland being then in a most unsatisfactory state, alike from a political and religious point of view, C. went to study theology at Utrecht. His scholarship, polite address, knowledge of men, and great political information, especially regarding his own country, recommended him to the notice of the Prince of Orange, who chose him as his confidential adviser in all matters relating to Britain. In 1682, being in England on a mission of observation from Holland, he was employed to negotiate between the English and the Scotch conspirators in the Rye House Plot. With others implicated, he was arrested and put to the torture of the thumb-screw, but refused to confess any thing that had been previously revealed, and that only on condition that what he said should not be used in evidence, either directly or indirectly, against any other person. At this time, he had secrets from Holland of the greatest importance in his possession, which he carefully concealed, although there can be no doubt that their revelation would not only have saved him from torture, but have obtained for him great reward and honor. Britain, therefore, owes very much indeed to the firmness of C. at this juncture. He returned to Holland about the be-

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ginning of 1685; and, acting mainly on his advice, the Prince of Orange planned and carried out the invasion of 1688. He accompanied the prince as chaplain, and after the settlement of the crown, when the prince had been firmly established as William III., C. was instrumental in effecting a reconciliation between him and the Scottish Church, when the ill advice of other councillors had nearly led to an open rupture. From 1693 to the death of the king in 1702, he could not have had more influence in Scottish affairs if he had been prime-minister of the country; and his authority in church-matters was such, that he was popularly called "Cardinal Carstairs." He was elected Principal of the university of Edinburgh in 1704, and in this capacity used all his influence with government to obtain an increase of patronage for the Scottish colleges. In the same year, he was presented to the Church of Greyfriars, and was appointed Moderator of the General Assembly next succeeding, an office to which he was four times elected in the course of eleven years. He died August 1715, deeply regretted by the whole nation, and leaving a reputation for scholarship and sincere piety, as well as for unbounded charity and political sagacity rarely equalled. See "Life of C.," by Rev. Dr Story (1874).

CARSTENS, Asmus Jacob, an eminent German artist, was born near Schleswig, May 10, 1754. In 1792 he went to Copenhagen, where, when first introduced to the Royal Gallery of Paintings and Casts from the Antique he was so excited that he shed tears of joy. After staying seven years in the Danish capital, where he produced his "Baldur's Death," and "Eolus and Ulysses," supporting himself chiefly by portrait-painting, he commenced a journey on foot to Rome, but was obliged to return for want of means after reaching Mantua. He resided in Lubeck for some time, but through the kindness of a wealthy amateur artist named Rodde, he contrived to reach Berlin, where his great composition, the "Fall of the Angels" (with 200 figures), gained for him an appointment as professor in the academy, while his decoration of a saloon in the Dorville Palace obtained for him an introduction to the king and a pension. He was now enabled to visit Rome, where he devoted himself to the study of the works of Michael Angelo and Raphael. His first work in Rome, a "Visit of the Argonauts to the Centaur Chiron," was distinguished by purity of style, beauty of forms, and fine distribution of light. His numerous subsequent drawings mostly represented scenes from the ancient classic poets, with subjects from Ossian, Dante, and Shakspeare. C. died May 26, 1798.

CART, a species of carriage with two wheels, in which respect it differs from the ordinary wagon that has four wheels. There are different kinds of carts, according to the nature of the goods or articles to be carried, and they also differ considerably in different countries. The C. is little seen in England, where the heavy and more capacious wagon takes its place. It is, however, used for agricultural and other purposes in Cumberland and adjoining northern counties. There, it differs only in a slight degree from the C. universally used in Scotland. The Scotch C. is an exceedingly convenient form of carriage for general merchandise, or for agricultural produce, and well adapted for being drawn on roads in a hilly country. A material advantage consists in its weight, being about only half a ton, while its usual load is from a ton to 22 cwt.; from which circumstance it is a particularly handy vehicle for comparatively light loads, and so far is superior to the English wagon, which is best adapted to carry huge loads of from two to three tons. In carrying hay, straw, or grain from the harvest-field, Scotch farmers employ a peculiar kind of C. without sides to admit of a bulky load; but they also, as occasion serves, use for a similar purpose an ordinary C., on which they place a moveable frame. All grain for market is carried in the one-horse C., and a driver takes charge of two carts. The following advantages of one-horse carts are well enumerated by Lord R. Seymour: "A horse, when he acts singly, will do half as much more work as when he acts in conjunction with another; that is to say, that two horses will, separately, do as much work as three conjunctively. This arises, in the first place, from the single horse being so near the load he draws; and in the next place, from the point or line of draught being so much below his breast, it being usual to make the wheels of single-horse carts low. A horse harnessed singly has nothing but his load to contend with; whereas, when he draws in conjunction with another, he is generally embarrassed by some difference of rate, the horse behind or before him moving

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quicker or slower than himself; he is likewise frequently inconvenienced by the greater or less height of his neighbor: these considerations give a decided advantage to the single horse-cart. The very great ease with which a low C. is filled may be added; as a man may load it, with the help of a long-handled shovel or fork, by means of his hands only; whereas, in order to fill a higher C., not only the man's back, but his arms and whole person must be exerted." To these just observations it need only be added, that in many parts of England there is a wasteful expenditure in horse-power, a pair of horses being often set to draw a clumsy wagon to market, containing a load which could with the greatest ease be drawn by one horse in a less ponderous machine.

The one-horse C. is employed by carriers all over Scotland, the load being usually piled high in a square form, and covered in with a woollen wrapper, in which state the C. is drawn 18 to 20 miles a day. See CARRIERS. In France and Germany, the carrier's C. is a more gigantic machine. Long in the body, very strong in construction, and poised on two high wheels with broad rims, this continental C. carries enormous loads, almost equal to what are seen in the large wagons of England. The ingenious manner in which the load is adjusted to rest exclusively on the wheels, and so relieve the single horse in the shafts, is matter of surprise to all strangers. All carts, whatsoever, in Great Britain, must bear the name and address of the owner, painted conspicuously on them, according to statute 1 and 2 Will. IV. c. 22. See WAGON.

CARTAGE'NA, a fortified seaport of Spain, on a bay of the Mediterranean, in lat. 37° 36' n., long. 0° 57' w. It is built partly on the declivity of a hill, and partly on a plain extending down to the sea, and is enclosed by hills which screen it from all winds. The harbor is one of the best in the Mediterranean, capacious enough to hold the largest fleets. The entrance is narrow, and completely commanded by the fortifications on an island called La Isoletta, on the south. It was formerly the largest naval arsenal not only in Spain but in Europe. The city, which is surrounded by walls, has a Moorish aspect; its streets, cathedral, and the ruins of an old castle being of that architecture. C. has manufactures of sail-cloth and glass, besides extensive blast-furnaces and smelting-works, and a trade in barilla, agricultural produce, and esparto grass. The tunny fishery is important, and its ancient silver and lead mines, recently re-opened, are again productive—the export of lead to Great Britain and France in 1873 being 32,000 tons. The zinc and iron ores amounted to 496,000 tons. In 1873 C. was seized by a communal junta, but was retaken by the national forces in 1874. Pop. of town and suburbs about 54,000. C., which was a colony of the Carthaginians, was built by Hasdrubal 242 B.C., under the name of New Carthage. It formed the headquarters of the Carthaginians in Spain, and soon became a city of much wealth and influence. It was captured by P. Scipio in 210 B.C., and became of importance under the Romans who are said to have employed 40,000 men daily in the mines in the neighborhood. It was sacked by the Goths, and did not again attain any note until the time of Philip II.

CARTE, Thomas, an English historian, distinguished for his industry and research, was born at Clifton, in Warwickshire, where his father was parish minister, in 1686. Educated at Oxford, he afterwards took the degree of M.A. at Cambridge, and entering holy orders, was appointed reader at the Abbey Church, Bath; but being attached to the Stuarts, he resigned his office rather than take the oaths to the new government. In 1722, he was suspected of having been concerned in the conspiracy of Bishop Atterbury, whose secretary he was, and £1000 was offered for his apprehension; but he escaped to France, where he remained for some years. On his return to England, he published a life of the Duke of Ormond, remarkable for the fulness of its information. In 1747—1755, he published a "History of England," bringing it down to the year 1654. This work is very valuable for its facts, but the author had not the capacity to grapple with these philosophically. Hume and other historians, however, have been much indebted to him for the materials of history. Among his other works was an edition of "Thuanus;" and at his death, in 1754, he left behind him 20 folio and 15 quarto volumes of MSS., in further illustration of the history of England to 1688, which have proved of great utility to subsequent writers. These are preserved in the Bodleian Library, Oxford.

CA'RTEL, during a time of war, is an agreement between the belligerents for an

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exchange of prisoners. Sometimes the name is given to a ship, called by the French a *bâtiment parlementaire*, commissioned to convey the exchanged prisoners, or to carry messages to the enemy. A ship, when thus employed, must carry no cargo, ammunition, or implement of war, except one gun for signals.

CARTER, Elizabeth, an English lady, remarkable for her classical attainments, and also for her knowledge of modern languages, was born December 1717, at Deal, Kent. Slow at first to learn, she afterwards displayed remarkable aptitude. In her 21st year she published a small volume of poems, and in the succeeding year she translated from the Italian of Algarotti "An Explanation of Newton's Philosophy for the Use of Ladies." These publications brought her into note, and obtained for her the friendship of such men as Bishop Butler, Archbishop Secker, Sir Joshua Reynolds, Burke, and Dr Johnson, the latter of whom especially held her in great esteem, and had the highest opinion of her proficiency as a Greek scholar. A translation of Epictetus which she made, was most favorably received by the literary press of her time, both at home and abroad. She died unmarried, February 1806, at the age of 89.

CARTERET, John, Earl Granville, a distinguished orator and statesman of the 18th c., was born April 1690, his father being Baron Carteret of Hawnes, Bedfordshire. His education, commenced at Westminster School, was completed at Oxford. From the latter place, according to Dean Swift's humorous assertion, he carried away more Greek, Latin, and philosophy than was at all becoming a person of such high rank. Introduced into the House of Peers in 1711, he spoke in favor of the Protestant succession, and in consequence received the early notice of George I., and obtained some lucrative appointments. In 1718—1719, he was appointed ambassador extraordinary to Sweden, and in the following year succeeded in concluding a peace between Sweeden, Prussia, and Hanover. In 1721, he was appointed secretary of state, and in this capacity defended with great zeal the proceedings of government in the Atterbury conspiracy. In 1724, he was made lord lieutenant of Ireland. During his vice-regency, he was in constant intercourse, and held frequent discussion, with Dean Swift about public affairs. His lord lieutenancy, which lasted from 1724 to 1726, and again from 1729 to 1730, was popular, particularly the latter period. From 1730 to 1742, he was one of the most able and determined of the leaders of the opposition in the House of Lords against Sir Robert Walpole, and on his displacement, was made a secretary of state. On the death of his mother in 1744, he succeeded to the title of Earl Granville, and in the same year had to resign his seals of office, the Broad Bottom Administration (q. v.) expressly excluding him; but he continued to receive marks of the royal favor. C. was a most liberal patron of men of letters. He died January 1763.

CA'RTHAGE, called *Carthâgo* by the Romans, *Carchêdon* by the Greeks, both of which are but forms of the native name *Karth-hadtha*, i. e., "New Town" (found on ancient coins), was the greatest city of antiquity on the north coast of Africa, and was situated in what now constitutes the state of Tunis, on a peninsula extending into a small bay of the Mediterranean Sea. It was founded, according to legend, by Dido (q. v.), a Phœnician queen, who had fled from Tyre after the murder of her husband almost nine centuries before the Christian era, but more probably (like the Anglo-Indian Calcutta) it originated in an emporium or *factory* established by the colonial merchants of Utica, and the capitalists of the mother-city Tyre, on account of the convenience of its situation. Unfortunately, we know very little of its growth. Our information only begins after C. had become one of the greatest commercial cities of the world, and we have but very scanty and one-sided accounts of it even then. The number of the inhabitants before its destruction amounted to about 700,000. The population was partly of Phœnician, partly of Libyan descent. The territory which the Carthaginians acquired by the subjugation of the Libyan tribes, and by the ultimate annexation of other older Phœnician colonies, with which they had at first been simply in alliance, such as Utica, Hadrumetum, Tunis, Hippo, the two Leptes, &c., extended in the middle of the 5th c. B.C. southward to Lake Triton, eastward to the Great Syrtis, and westward to Hipporegius (now Bona). The maritime power of the Carthaginians enabled them also to extend their settlements and conquests to the other coasts of the Mediterranean. In the

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6th c. B. C., they were masters of Sardinia, and had begun to contend for the possession of Sicily. Hanno (q. v.) founded colonies on the west coast of Africa beyond the Straits of Gibraltar, and Himilco visited the coasts of Spain and Gaul. The relations of C. to foreign States in earlier times are not very clear. The first treaty with the Romans was concluded in 509 B. C.; the second, in 348 B. C.; the third, in 306 B. C. The connected history of C. begins with the 5th c. B. C., a period of wars between the Carthaginians and the Greeks in Sicily. The Carthaginian army under Hamilcar was destroyed by Gelon at Himera in 480 B. C. It was not till 410 B. C. that the war began which ended in the conquest by the Carthaginians of some parts of the island. Dionysius the Elder, or rather the pestilence working for him, put a stop to their conquests, but did not succeed in expelling them. War raged almost constantly between Dionysius and the Carthaginians. The more feeble reign of Dionysius the Younger afforded them an opportunity of extending their conquests, yet they were frequently repelled and defeated by the Sicilian Greeks; and during 311–301 B. C., Agathocles carried the war into Africa, and attacked C. itself. After his death, the Carthaginians again increased their dominions in Sicily; and although Pyrrhus contended successfully against them at first, he left that island entirely in 275 B. C. The subjugation of the south of Italy by the Romans, brought the two great and conquering nations into collision, and the First Punic war arose. 264 B. C., and after a great naval victory of the Romans, terminated in 241, the Carthaginians giving up Sicily, Sardinia, and Corsica, and paying to the Romans a large some of money. Soon after this, a mutiny of the hired troops of C., combined with an insurrection of the Libyan tribes, the ancient inhabitants of the country, who were kept down by the arbitrary rule of the Carthaginian colonists, threatened the entire ruin of the city. Hamilcar brought that bloody war, however, to a successful termination, and led an army to Spain, where he, and after him Hasdrubal, obtained great successes. Here was founded New C., now Cartagena (q. v.). After Hasdrubal's death, 221 B.C., Hannibal (q. v.), burning to revenge the defeat which his native city had sustained from the Romans, broke the treaty with them, and took Saguntum, 219 B.C. Thus began the Second Punic war, in which Hannibal pursued his career of conquest from Spain through Gaul, and across the Alps into Italy itself, defeated the Romans with terrible slaughter in various battles, and, by that of Cannæ in particular, brought Rome to the very brink of ruin. Yet the war terminated in the total defeat of the Carthaginians by Publius Cornelius Scipio, who overthrew their power in Spain, and was victorious over Hannibal in the final and decisive battle of Zama, in Africa, in October 202. A peace was then concluded, in which the Carthaginians were limited to their African territories; but most of their ships of war and war-elephants were taken from them, besides an immense sum of money, and they were taken bound not to make war without permission of the Romans. Massinissa, king of Numidia, skilfully availed himself of dissensions which arose within C. between the nobles and the people, to advance his own interests at the expense of the Carthaginians; and as they (151 B. C.) opposed him, and drove his adherents out of the city, the Romans seized the opportunity for a new declaration of war, 149 B. C., on the ground that the treaty was broken; and after a siege of two years, C. was taken by Publius Cornelius Scipio Aemilianus, 146 B. C. For six days the combat was maintained in the streets of the city, and for seventeen days the work of its destruction by fire was carried on by the conquerors. The country became a Roman province. C. Gracchus sent out 6000 colonists to found a new city on the site of Carthage. It was called Junonia, but it did not prosper. Augustus, carrying out the intention of his great uncle, restored the city, and the new C. had become, in the second and third centuries of the Christian era, one of the finest cities of the Roman empire. In 439 A. D., Genseric made it the capital of the Vandal kingdom; Belisarius conquered it in 533, and named it Justiniana; the Arabs under Hassan utterly destroyed it in 637 A. D.; and now only two or three small hamlets and a few ruins mark its site.

We have not very satisfactory accounts of the constitution of the Carthaginian state. It is certain that it was oligarchical, and that the chief power was in the hands of the great families (gentes), from whose members the senate, amounting to 300, was chosen. This senate appointed, as it were, a more select council of 30, and sometimes a still smaller one of only 10, at the head of whom were two *suffetes*

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(probably the same as the Hebrew *shofetem*, "judges"), but it is not certain what relation these bore to one another, or how their power was apportioned between them. We can gather dimly, from various scattered statements, that the Carthaginian oligarchy, while despising the multitude, was itself split up into factions, and torn by family jealousies. Corruption largely prevailed; and it would perhaps have been better for the country if the power had been in the hands of a popular despot than of a band of insolent and tyrannical nobles.

The Carthaginian army was raised from the conscription of the subjugated Libyans, from the hired Numidians, and from slaves. In the time of Agathocles, the city sent forth 40,000 heavy armed infantry, 1000 cavalry, and 2000 war-chariots, but the state could easily raise 100,000 troops. The fleet in the First Punic war consisted of 350 ships, carrying 150,000 men. How C. contrived to raise revenues sufficient to cover the enormous expense her military and naval organisation involved, is not very clear. It was, in all likelihood, derived from tribute imposed on subject Libyan or Numidian races, in great part from mines in Spain, and from import duties derived from her maritime and inland trade, which was prodigiously great. Her merchantmen visited every coast and island of the Mediterranean, and even ventured as far as the Azores, Britain, the Baltic, &c.; while her caravans penetrated through Sahara to the gold producing districts of the Niger, and through the Libyan Desert to the lands along the Nile.

The religion of the Carthaginians appears to have been substantially the same as that of the Phœnicians—a worship of the stars and of fire. Moloch was the chief deity, and to him children and captives were sacrificed. The highest natural manifestation of this deity was the Sun. Besides Moloch, the Carthaginians worshipped the Tyrian Hercules; Astarte, the goddess of the elements; Esmun, the god of the celestial vault; and a variety of heroes, heroines, and genii or spirits, such as the Genius of Death, Hamilcar (who fell at the battle of Himera), Dido, the brothers Philæni, &c., as well as a few of the lesser Greek divinities, of whom a knowledge had been obtained in Sicily. It does not appear that there was a distinct sacerdotal order in Carthage. Probably religious ceremonies were performed by the dignitaries of the state, but our knowledge on this interesting point is too meagre to permit of our arriving at any very definite conclusion.

CARTHAGE, Cape, a headland of North Africa, jutting out into the Mediterranean, in lat. 36° 52′ n., long. 10° 22′ e. Traces of the ancient city of Carthage (q. v.) are found on it to the north of the Tunis lagoon.

CARTHAGE'NA, capital of the state of Bolivar, one of the United States of Colombia. It stands on the Caribbean Sea, a little to the s.w. of the mouth of the Magdalena, in lat. 10° 26′ n., and long. 77° 54′ w., having the best harbor on the coast, with a naval arsenal and strong fortifications. Its population is estimated at 10,000, not more than one-tenth being white. The temperature ranges from 80° to 86° F.—the air, however, being dry and healthy. In the history of Spanish America, and more especially in that of the war of independence, the city occupies a prominent place.

CARTHAGENA BARK. See CINCHONA.

CARTHA'GO, a term of various application in Central America.—1. An almost landlocked bay or lagoon of the Caribbean Sea near the north-west extremity of the Mosquito shore.—2. A river entering the same from the south-south-west, about lat. 15° n., and long. 84° w.—3. A river of Costa Rica, flowing into the Gulf of Nicoya, an inlet of the Pacific, near lat. 9° 30′ n., and long. 84° 30′ w.—4. A city, or rather the ruins of one, on the same, about 60 miles from its mouth. Down to 1841, it was the capital of Costa Rica; but being in that year all but destroyed by an earthquake, it was supplanted by San José, previously its superior in wealth and importance, about 15 miles to the west-north-west of itself. The volcano of its own name, doubtless connected with its overthrow, is valuable as a landmark to mariners.

CA'RTHAMINE, or Carthameine. The dye so called is obtained by a chemical process from safflower (q. v.), (*Carthamus tinctorius*), in crystals which are insoluble in water, but slightly soluble in alcohol and ether. When newly precipitated, C. immediately and permanently attaches itself to cotton or silk, but not to wool, requiring no mordant, dyeing the fabric a fine red, which is changed to yellow on the

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addition of alkalies, and may be returned to red again on being treated with acids.

CARTHU'SIANS, a monastic order which owes its origin to St Bruno, who retired in 1086 with six companies to the solitude of La Chartreuse (whence the name), near Grenoble, where they built hermitages, wore rude garments, and lived upon vegetables and coarse bread. In 1134, the fifth prior, Guigo, composed a body of rules, called the "Statuta Guigonis" or "Consuetudines Cartusiæ," but they have been often changed. After 1170, when the order received papal approbation, it extended rapidly. It dates from 1180, in England, where the name of Chartreuse-houses was corrupted into charter-houses. The C. were divided into two classes, fathers (*patres*) and brothers (*conversi*). Each occupied a separate cell, with a bed of straw, a pillow, a woollen coverlet, and the means of manual labor or of writing. They left their cells, even for meals, only on festivals and on days of the funeral of a brother of the order. Thrice a week, they fasted on bread, water, and salt, and there were several lengthened fasts in the year. Flesh was forbidden at all times, and wine, unless mixed with water. Unbroken silence, except on rare occasions, was enforced, as well as frequent prayer and night-watching. These austerities were continued, with little modification, by the modern C. The order at one time counted 16 provinces, and can still boast some of the most magnificent convents in the world—as *La Grande Chartreuse*, near Grenoble, and *Certosa*, near Pavia. They were given to hospitality and works of charity, and were on the whole better educated than the mendicant orders. Their principal seats were in Italy, France, and Switzerland; but they have shared the fate of the other monastic establishments, and their convents are now for the most part solitudes indeed.—The Carthusian nuns arose at Salette, on the Rhone, in France, about 1229. They followed the rules of the Carthusian monks, but with some mitigations, of which the most notable is that they have a common refectory.

CA'RTILAGE is a firm elastic substance, of a pearly whiteness, presenting to the unaided eye a uniform and homogeneous appearance. Cartilages may be divided into the *temporary*, the *permanent*, and the *accidental*. The *temporary* cartilages are substitutes for bone in the earlier period of life, and after a certain time become ossified. See OSTEOLOGY. At birth the extremities and larger eminences of the long bones, and the margins of the flat bones are still cartilaginous, and this C. does not altogether disappear till the period of puberty. The *permanent* cartilages are either *articular* or *non-articular*. *Articular* cartilages are attached to the extremities of bones, and enter into the formations of joints. *Non-articular* cartilages are usually more flexible than the articular. They are sometimes attached to bones, to lengthen them out, as, for instance, in the nose, the auditory canal, and the Eustachian tube. See HEARING, ORGANS OF. In other cases they form the basis of distinct organs, as the larynx, the trachea, and the eyelids. *Accidental* cartilages are cartilaginous concretions, which are occasionally found in situations where they do not normally occur, and are of no general interest. The physical properties of cartilages, especially their elasticity, resisting power, and incapability of extension, are such as to fit them admirably for the functions which they have to perform in the animal economy. A brief notice of the microscopical characters of C. will be found in the article CELLS, and a reference to its chemical composition will be found in the articles GELATINOUS TISSUES and GLUTEN.

CARTILA'GINOUS FISHES are those fishes which have a skeleton destitute of bony fibres. In some of these fishes, the skeleton is merely rudimentary, so that they seem to form an intermediate link between vertebrate and invertebrate animals. In the lancelets (q. v.), (*Amphioxus*) it consists of nothing more than a slender, transparent, flexible dorsal column; in *Myxine* also it is a soft flexible tube, without appearance of vertebræ or of ribs; in the lampreys, the dorsal column is still a mere cylinder of cartilage, without any notable division into segments; whilst even in the sturgeon, the centre of the backbone is a continuous gelatinous cord, and in the sharks the vertebræ are formed of hollow cones, meeting at their apices in the middle, and having their cups filled with the remains of the gelatinous cord, an arrangement from which result great elasticity and flexibility. In many instances, even in the higher C. F., several vertebræ are united in a single piece; in all of them the skull is formed of a single piece without sutures, although the general form agrees

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with that of the skull of other fishes, and the same parts or regions may be recognised. The calcareous matter present in the skeleton is always deposited in a granular manner, giving a characteristic dotted appearance; but even in the skull of the Basking Shark, one of the most highly organised, the earthy matter has been found to form little more than 3 per cent. of the whole substance; in the skeleton of the lamprey, it is only 1¼ per cent. In other parts of their organisation, C. F. differ from each other very widely; some of them possessing the organs of the senses in as great perfection as any fishes whatever, whilst in others these organs are very imperfectly developed. Linnæus placed the C. F. along with Batrachian reptiles in his class *Amphibia*. By the general consent of naturalists, however, they are placed in the class of fishes. Cuvier, referring to the very different degrees of organisation which they exhibit, says "they form a series ranging parallel to the bony fishes, just as the marsupial mammalia range parallel with the other ordinary mammalia." Owen and others, admitting the justice of this view have, however, pointed out in the C. F. generally, characters corresponding with those of the osseous fishes in their embryotic state, and with the permanent or mature conditions which prevailed among the fishes of some of the older geological periods. One remarkable characteristic even of the higher groups of C. F.—sturgeons, sharks, rays, &c.—is the *heterocercal* tail, the vertebra column being prolonged into the upper portion of the caudal fin, and the lower one given off on its under side, as in the fossil fishes generally of the Old Red Sandstone and other oldest fish-producing rocks—Cuvier divided C. F., or *Chondropterygii* (Gr. cartilage-finned), into three orders: *Sturiones* (Sturgeon, Chimæra, &c.), having the gills free, and gill-openings with a lid, like the osseous fishes; *Selachii* (Sharks and Rays), having the gills fixed, and consisting of folds of membrane on a plane surface, with numerous gill-openings, the jaws movable as in other fishes generally; and *Cyclostomi* (Lampreys, &c.), also having fixed gills and numerous gill-openings, the mouth adapted for sucking. Müller and Owen, however, separate the *Cyclostomi* of Cuvier from the other C. F., on account of important anatomical differences, particularly in the structure of the heart, which in the *Cyclostomi* wants the *bulbus arteriosus*, or thick muscular swelling of the commencement of the arterial system close to the ventricle; whilst this, which may, in fact, be considered as a third chamber of the heart, is present in the *Sturiones* and *Selachii*, and within it are three or more longitudinal rows of valves; characters derived from the vascular system being deemed by these great naturalists of the highest value in determining the arrangement of the class of fishes. The lancelets occupy a place by themselves, from their absolutely wanting a heart, and having the circulation carried on by the muscularity of the entire vascular system.

CARTOO'N (Ital. *cartone*, pasteboard; from Lat. *charta*, paper.) In the fine arts, C. is a design on strong paper, of the full size of a work to be afterwards executed either in fresco, oil color, or tapestry. The object of the artist in preparing a C. is, that he may adjust the drawing and composition of his subject in circumstances in which alterations can be effected with facility, before proceeding to the execution of the work itself. Cartoons are generally composed of a number of sheets of stout paper or pasteboard, pasted together at the edges, and stretched on a frame. The surface is sometimes *primed*, or washed with a ground-color; but more frequently this process is dispensed with. The drawing is made either in chalks or in *distemper* (q. v.), in which latter case the C. itself has very much the appearance of a fresco. Frequently only two colors are used, merely for the purpose of producing light and shade, in which case the C. is said to be *in chiaro oscuro*. The C., when finished, is transferred to the canvas or plaster on which the work is to be executed, either by tracing with a hard point, or by pricking with pins, charcoal in both cases being used. Sometimes lines are simply drawn across it, or, if it is wished to preserve it from injury, threads are stretched across it from pins placed at the required distances along the edges. In *fresco* painting (q. v.), the plaster on which the work is executed must be kept wet, in order that it may absorb the color, and consequently only a small portion can be executed at a time. For this reason, the C. must be traced in small compartments of the size that the artist can finish without stopping. It is here, consequently, above all, that the necessity for the previous execution of a C. is greatest, as it would be impossible to sketch the whole design on the plaster in the first instance. But the great masters used such studies in

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chiaro oscuro as guides to them in almost all their more extensive works, and many of these monuments of their care, as well as of their genius, have been preserved. We have cartoons of Andrea Mantegna, Domenichino, the Caracci, &c.; but the finest specimens of cartoons in existence are those of Raphael at Hampton Court. These marvellous conceptions were sent to Flanders in the reign of Leo X., in order that they might be copied in tapestry in two sets, one of which was designed for the pope, the other for a present by the pope to Henry VIII. of England. The tapestries, which are very inferior to the designs, are still in existence. One set is in Rome, the other was in England till the death of Charles I., when it was purchased by the Spanish ambassador, and carried to Spain. At a recent period it was brought to London and offered for sale, but as no English purchaser was found, it was again carried to the continent. For many years the cartoons, originally twenty-five in number, lay neglected at Brussels, and many of them were destroyed. The seven now at Hampton Court were at length purchased by Rubens for King Charles I. It is an instance of Cromwell's good sense, in a direction in which it was not often exhibited, that at the dispersion of the royal collections, these cartoons were purchased for the nation by his special command. So low was the artistical taste of the time, however, that whilst the "Triumph of Julius Cæsar," by Andrea Mantegna, still at Hampton Court, was valued at £2000, the cartoons of Raphael were set down at £300! In Charles II.'s time, these remarkable works were again consigned to oblivion. An attempt was made to have them copied in tapestry, by which they were seriously injured. William III., strangely enough, followed in Cromwell's footsteps in appreciating what Charles II. had neglected. He had the cartoons restored, and built a gallery for them at Hampton Court, where, with the exception of a visit to Windsor in George III.'s time, they have since sojourned. The following are the subjects represented: 1. Paul Preaching at Athens; 2. The Death of Ananias; 3. Elymas, the Sorcerer, struck with Blindness; 4. Christ Delivering the keys to Peter; 5. The Sacrifice at Lystra; 6. The Apostles Healing the Sick at the "Beautiful Gate" of the Temple; 7. The Miraculous Draught of Fishes. Our space and our design equally preclude us from attempting any statement of the merits of these exquisite compositions. Several of the lost cartoons are partially transmitted to us by engravings, some of which were executed from the tapestries; others, it is believed, from the originals. The subjects of these are—1. The Adoration of the Kings; 2. Christ appearing to Mary Magdalene; 3. The Disciples at Emmaus; 4. The Murder of the Innocents; 5. The Ascension. These were engraved, along with the others, by Somereau, a French engraver, in 4to. Other cartoons of Raphael exist—one the property of the Duke of Buccleuch, and two in the possession of the king of Italy, which are said to have belonged to the set sent to Flanders. There is also a portion of one in the National Gallery in London, but it is now painted over with oil color. The best engravings of the cartoons at Hampton Court are by Dorigny, Audran, and Holloway; but in future it is probable that they will be more known to the public by means of photographs, of which Messrs Colnaghi and others have already produced very beautiful specimens.

CARTOU'CH is a word much used in the French military service, but less frequently in the English. The name was once given to a wooden case containing 200 to 300 musket-bullets, and 8 or 10 1-lb balls, fired from a mortar or howitzer in defence of a ditch or intrenchment; but such missiles have been superseded by others. The cartridge-box carried by the soldiers used to be called a C. in England, and still is in France.

CARTOUCHE, the name by which the French, and we after them, designate the ovals on which the hieroglyphic characters of the names of Egyptian kings are sculptured. See CAVO-RILIEVO. C. is also used to signify a tablet, either for ornament or to receive an inscription, so formed as to resemble a sheet of paper or parchment, with the edges and ends rolled up. Cartouches are often seen on tombs. The same term is sometimes applied to modillions, or brackets supporting a cornice.

CA'RTRIDGE is a cylindrical case made to contain either the whole or a part of the materials for discharging from a firearm. Those for ordnance or large guns are chiefly made of serge and flannel, sewn up into the form of a bag, which, supplied with a given weight of powder, is tied round the neck, and strengthened by iron hoops. The weight of powder varies from about 150 lbs. for a 35-ton gun, to a few ounces for a mountain gun.

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Catridges for small-arms which load at the muzzle are usually paper tubes, containing a leaden ball and a few drachms of powder. The tubes are made in such a way that the powder has two or three thicknesses of paper around it, while at the mouth of the tube and over the bullet there is only one. The paper over the bullet is lubricated generally with a composition of beeswax and tallow. In loading, the paper at the mouth of the tube has to be twisted or bitten off; the powder is then poured into the barrel, the tube reversed, and the bullet inserted into the muzzle, and the tube broken away. Catridges for breech-loading small arms are generally formed of a thin sheet of brass coiled into a cylinder, and having an iron case, in the centre of which is the percussion arrangement. Those used for the Snider and the Martini-Henry rifles are described in the article on BREECH-LOADING ARMS. Besides the C. case of coiled brass, there are others made of solid brass or copper (an American invention), and these seem to be gaining favor abroad, the Prussians having adopted such a case for the new Mauser rifle.

For muzzle-loading shot guns, the chief catridges used contain a charge of shot packed in a paper cylinder of a size suitable for the bore of the gun. Some of these, in addition to the paper covering, are surrounded with a wire net-work, for the purpose of increasing the range and penetration.

The C. for breech-loading shot guns is usually a stout cylinder of paper with a metal case. They are made of various sizes to suit the different calibres of guns, and with pin or central fire ignition. In the pin-fire C. a small brass pin passes through the side of the case into the percussion cap, and protrudes through a small hole in the top of the barrels. The pin is struck by the hammer of the gun, and forced into the percussion cap, which explodes, and ignites the powder. In the central-fire C., the cap is in the centre of the case, and is exploded by the hammer of the gun acting on a piston contained in the false breech.

In America, a solid brass C. case is often used for shot guns.

For sporting rifles, the cartridges are quite as numerous and as varied as for shot guns. With large-bore rifles the same C. case is generally used as for shot guns, but loaded with powder and ball (spherical, solid conical, hollow conical, or shell). For small bores, or what are known as Express rifles, either a coiled brass C. case, similar in construction to that for the Snider or Martini-Henry rifle, but made to contain a larger charge, or a solid brass case is used. The coiled case can be reloaded twice or thrice, while the solid case can be reloaded as often as twenty times, and on this account the latter is rapidly gaining favor with sportsmen in India and Africa. The express C. contains a very heavy charge of powder, with a light hollow conical bullet giving very great velocity, low trajectory, and immense killing power.

Cartridges for breech-loading pistols and revolvers are generally small metal cylinders containing a charge of powder and a bullet, and with rim, pin, or central fire ignition, the diameter varying from ·230 of an inch upwards.

CARTRIDGE-PAPER, a light-colored strong paper, originally manufactured for soldiers' Cartridges (q. v.), is extensively used in art, its rough surface being useful for certain kinds of drawing.

CARTWRIGHT, Edmund, celebrated on account of his invention of the power-loom, was born April 24, 1743, at Marnham, Nottinghamshire. Educated at Oxford, he obtained a living in the English Church, and devoted himself exclusively to his ministerial duties and to literature, until a casual conversation in 1784, directed his attention to machinery, and in 1785 he exhibited his first Power-loom (q. v.) in action, an ingenious though very rude machine; upon which, however, he subsequently effected improvements rendering it almost perfect. Its introduction was vehemently opposed, and a mill fitted up with 500 of his looms was ignorantly and maliciously burned down. C., in 1790, took out a patent for combing wool, and secured patents for various other improvements in connection with manufactures. But his patents yielded him little return, and in 1809, government, in consideration of his inventions, granted him £10,000. C. was the author of a legendary poem, entitled "Arminia and Elvira," and other poetical pieces. He died October 1823.

CARTWRIGHT, Thomas, a distinguished Puritan divine of the 16th c., was born in Hertfordshire about 1535. He studied at Cambridge, where, in 1570, he was chosen Margaret Divinity professor. His lectures here were too honestly critical of the polity of the church to be acceptable to the chief authorities, who deprived him of his professorship, and subsequently of his fellowship. C. travelled on the conti-

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nent, and made the friendship of such men as Beza, who, in a letter concerning him, says, "I think the sun doth not see a more learned man." On his return to England, he again became embroiled with the church and the government, and for his nonconformity suffered imprisonment several times. He died December 1608. He wrote "A Confutation of the Rhemish Translation, Glosses, and Annotations of the New Testament."

CARUS, Karl Gust., a German scholar, physiologist, physician, and artist, was born at Leipsic, 3d January 1879. He first attracted notice by a series of lectures on comparative anatomy, delivered in his native city about the year 1812. After having superintended, during the war of 1813, the French hospital at Pfaffendorf, he went to Dresden, where he was appointed professor of midwifery in the newly organised medico-chirurgical academy; but resigned his office when elected court-physician and councillor of state. His house was the rendezvous of all the most distinguished savans and artists in Dresden. C. wrote a vast variety of works, some of which are marked by original and striking views, as for instance, "Ueber den Kreislauf des Blutes der Insecten," in which he demonstrates the circulation of the blood in insects. He died in July 1869.

CA'RVEL-BUILT. The difference between the *carvel* and the *clincher* methods of arranging the outer planks in ship and boat building is explained under CLINCHER-BUILT.

CARVIN-EPINOY, a town of France, dep. of Pas-de-Calais, 11 miles south-south-east of Lille, and about the same distance by railway. There are manufactures of beet-root sugar, starch, earthenware, and leather. Pop. (1872) 5750.

CARVING, a subordinate branch of sculpture, is usually performed on ivory or wood. Ivory was the favorite material for this purpose in the east from an early period. Among the Babylonians, who likewise practiced gem-engraving to a great extent, carved heads for staves were executed in vast quantities, as every Babylonian carried a staff and a signet-ring. During the palmy days of Grecian art, ivory was largely employed; the nude portion of the colossal statues of the gods being composed of some solid material overlaid with plates of ivory, while the remaining portions were of plate gold. At a later period, ivory was chiefly employed in small works, usually of a decorative character. During the earliest period, statues of the gods were generally of wood, painted, gilt, or draped with colored robes, different kinds of wood being appropriated to different divinities. Carvings in ivory form an important branch of early Christian sculpture. Among the most curious of these are the ivory tablets adorned on the outside with low-reliefs, and in the inside coated with wax for the purpose of writing upon. The chair inlaid with ivory that belonged to Archbishop Maximilian in the cathedral at Ravenna, is of this period (546—555). In the year 803, Charlemagne received two richly carved doors as a present from Constantinople, but works of the same kind were executed at a much earlier period. Toward the end of the middle ages, the art of carving in wood was brought to a high degree of perfection in Germany. Altars were adorned with carvings of this material, often of large size, and with numerous figures; in general, the nude portions were carefully and tastefully colored after nature, and the draperies gilt. Specimens are to be seen in the churches at Altenberg, Erfurt, Prague, and in some churches in Pomerania. The finest and most perfect specimens are a series of reliefs relating to the doctrine of transubstantiation in the churches at Tribsees. Many of the Belgian churches also possess very beautiful examples of wood-carving. Michael Wohlgemuth of Nuremberg, and after him Veit Stoss, were eminent carvers in wood. The wood-carving on the great altar of the cathedral at Schleswig by Hans Bruggemann belongs to the beginning of the 16th century. Many graceful specimens of wood-carving, on a smaller scale, belonging to this period, are to be seen in museums. Nuremberg was celebrated for its wood-carvings; but only a few of the many works ascribed to him can be assigned with certainty to Albert Dürer. Portrait medallions, usually cut in box, were much in vogue during the early part of the 16th century. The first artist in this line was Hans Schwartz of Augsburg. During the 17th and 18th centuries, we find ivory again extensively employed in crucifixes, crosses, and goblets, with relief representations. The most eminent artist is Franz de Quesnoy.

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CARY, Rev. Henry Francis, known for his admirable translation of Dante, was born at Birmingham in 1772. At Oxford, where he entered Christ Church as a commoner in 1790, he was early distinguished as a classical scholar, and also for his knowledge of Italian, French, and English literature. In 1805 he translated Dante's "Inferno," and in 1814, the whole of the "Divina Commedia," a translation remarkable not only for its accuracy, but for its expressiveness and force. He afterwards translated Pindar's "Odes" and Aristophanes's "Birds," and wrote a series of memoirs, in continuation of Dr Johnson's "Lives of the Poets." For some years he held the appointment of assistant-librarian in the British Museum, and died in 1844. A memoir by his son was published in 1847.

CARY, Sir Robert, son of Henry Cary, Lord Hunsdon, was born in 1559 or 1560, and rose to eminence in the civil service of Queen Elizabeth. For a number of years, he acted as English warden on the marches. As a courtier, he was present at the death of Elizabeth, 1603, and expeditiously rode on horseback to Edinburgh to communicate the intelligence to her successor, James VI. At the coronation of Charles I., he was elevated to the peerage as Earl of Monmouth. At his death without male issue, the earldom became extinct. Sir Robert Cary wrote his "Memoirs" (Edin. 1808), a work interesting chiefly from notices connected with Border history.

CA'RYA. See HICKORY.

CARYA'TIDES (pl. of *Caryatis*, literally, a woman of Caryæ), a name given to female figures, in Greek architecture, when applied instead of columns to support a roof. The traditional account of the origin of the name is, that the inhabitants of Caryæ, a city in Arcadia, having joined the Persians after the battle of Thermopylæ, the Greeks, after their victory over the Persians, destroyed the town, slew the men, and carried the women into captivity. As male figures representing Persians were used for this purpose, it occurred to Praxiteles, and other Athenian artists, that female Caryatæ, in their national costume, might be thus employed to commemorate the disgrace of their country. Lessing, and various other writers, have treated this account as fabulous; but it seems to be confirmed by a bas-relief preserved at Naples, in which two female figures are represented in the attitude of C., and which has a Greek inscription mentioning the conquest of Caryæ. Male figures used for the same purpose are called Atlantes (q. v.).

CARYO'CAR, a genus of large trees of the natural order *Rhizobolaceæ*, and almost constituting the whole order. They are all natives of Guiana and Brazil, and are sometimes called *Pekea* trees. They yield good timber for ship-building, and produce the delicious nuts, now not uncommon in the London market, called *Butter nuts* or *Souari nuts*. The fruit is a sort of drupe, containing several combined nuts. The fleshy part of the drupe consists of a butter-like substance, which melts between the fingers, and is used in cookery instead of butter, on which account these trees are sometimes called *butter-trees*. It forms merely a thin covering for the nuts, the bristles on the outer surface of which, in some of the species, sting like the hairs of the nettle, and are very troublesome to those who open them. The kernels are remarkably soft. An oil is extracted from them which is scarcely inferior to olive oil. *C. nuciferum* is now cultivated in the island of St. Vincent; but *C. butyrosum*, *C. glabrum*, *C. tomentosum*, and other species appear equally worthy of attention.

CARYOPHYLLA'CEÆ, a natural order of exogenous plants, containing upwards of 1000 known species, mostly herbaceous plants, a few half shrubby. The stems are tumid at the articulations; the leaves always opposite and entire, often uniting around the stem. The flowers are regular; the calyx persistent, of 4—5 sepals, either free or united into a tube; the corolla of 4—5 petals, which are frequently bifid, and generally terminate in a claw at the base, sometimes wanting; the stamens as many, or twice as many, as the petals; the ovary of 2—5 carpels; the stigmas sessile; the fruit is a one-celled capsule, with central placenta, to which the seeds are attached.—The plants of this order are mostly natives of temperate and cold countries; some of them are only found on tropical mountains, near the limits of perpetual snow. Most of them are inconspicuous weeds; some produce beauti-

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ful flowers; almost all are insipid and inert; a few contain *saponine*, and afford a substitute for soap. See SOAPWORT. To this order belong the Pink, Carnation, Sweet William, Lychnis, Chickweed, &c.

CARYOPHYLLUS. See CLOVES, MYRTACEÆ.

CARYO'PSIS, in Botany, a fruit in which the seed and pericarp are so incorporated as to be inseparable, and even undistinguishable. The grain or fruit of grasses, as Wheat, Barley, Rye, Maize, &c., is a caryopsis.

CARYO'TA, a genus of palms, natives of the East Indies, one of which *C. urens*, remarkable for the acridity of its fruit, which produces a burning sensation when its pulp is applied to the skin, is also highly valuable for the great quantity of juice (*toddy*) which flows from its wounded spathes, sometimes, in the hot season, to the amount of 100 pints in twenty-four hours from a single tree. Sugar (*jaggery*) is made from this juice by boiling it down, and on this account this palm is sometimes called the Jaggery palm. The pith of old trees, or farinaceous part of the trunk, is also much used for food, and is said to be equal to the best sago. The outer part of the stem is very hard, and appliable to many purposes. The fibres of the leaf-stalks are made into ropes, which are very strong and durable; the leaf-stalks, merely stripped of the leaflets, are used as fishing-rods, being light, tapering, and elastic; and the woolly substance found at their base is sometimes used for caulking ships. This palm is found both in India and Ceylon, and abounds chiefly in mountainous districts. It rises to a height of 60 feet, with a trunk of a foot in diameter, and a magnificent spreading head of great double pinnate leaves, and triangular leaflets, the apex of the triangle being their point of attachment.

CASACALE'NDA, a town of Italy, in the province of Campobasso, 17 miles north-east of Campobasso, on the site of the ancient Calela. Fruits and wine of good quality are produced in the district, where silk-worms are also reared. Pop. 5900.

CASA'LÉ, a city of n. Italy, province of Alessandria, situated on the right bank of the Po, which is here crossed by an iron bridge, 38 miles e.n.e. of Turin. It is a place of considerable antiquity, and occupies the site of a more ancient town. Many Roman remains are found, and coins of the early ages of the republic. It has a cathedral, dating from the 8th c., with valuable archives. The old citadel, founded in 1590, was one of the strongest in Italy, and within recent years the fortifications have been greatly strengthened and extended. During the Italian campaign of 1859, C. was occupied by divisions of the Sardinian army, and for a short time formed the head-quarters of the French emperor. It has manufactures of silk-twist, and a trade in the produce of the district, which is very fertile. Pop. (1871) 20,436. C. formerly gave its name to a province which had an area of about 350 square miles, and a population of about 143,000.

CASA'L-MAGGIO'RÉ, a town of n. Italy, province of Cremona, on the left bank of the Po, 22 miles east-south-east of Cremona. Being subject to frequent inundations from the river, strong embankments have been constructed for its protection. It has manufactures of earthenware, leather, glass, &c. Pop. 5000.

CASA'L PUSTERLE'NGO, a town of n. Italy, province of Milan, 12 miles south-east of Lodi, on the road to Cremona. It has manufactures of silk fabrics, linen, and earthenware, and an extensive trade in Parmesan cheese, which is here manufactured of the best quality. Pop. 5600.

CASAMA'SSIMA, a town of Italy, in the province of Bari, 14 miles south-east of the city of that name. It has a convent and two abbeys, and the vicinity produces wine and almonds. Pop. 6600.

CASANO'VA, Francis, a celebrated painter of battles and landscapes, was born in London, of Venetian parents, 1732. Educated in Italy, he afterwards went to Paris, from which he was driven by the severe criticism of Diderot. C. then took up his abode in Dresden, where he painted chiefly battle-pieces, and by one of his greatest works gained a place in the Academy. He afterwards went to Vienna, and painted for the Empress Catharine her victory over the Turks. He died at Briel, near Vienna, 1805. The execution, and especially the coloring of his works, are excellent.

CASANOVA DE SEINGALT. Giovanni Jacopo, a notable adventurer of the

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Cagliostro species, was born, 1725, in Venice, and studied in Padua, afterwards in Venice, intending to enter the church. Having been expelled for sufficient reasons from a seminary of priests, he travelled to Naples, visited Rome, and after many adventures, arrived in Constantinople. On his return to Venice in 1745, he supported himself for a time by his skill as a violinist, until he gained some celebrity by curing a senator who had been attacked by apoplexy. His irregularities again drove him from Venice. He now wandered about for some time among the chief cities in the north of Italy, Milan, Mantua, Verona, Ferrara, Bologna, Parma, &c., but in 1750 he proceeded to Paris, where he was patronized by the nobility, and became acquainted with several eminent authors. It is needless to mention in detail his endless, inexplicable peregrinations. He visited almost every European capital, was somehow introduced to the best company, invariably excited the disgust or ill-will of those who knew him, and had always to "vanish" after a brief period of enjoyment. In 1761, we find him distinctly professing the miraculous after the Cagliostro fashion: he having undertaken to regenerate old Madame D'Urfé into a young man—for a consideration! He died in Bohemia in 1803. His celebrated memoirs, "Mêmoires écrits par Lui-même" (12 vols., Leip. 1826—1838), contain many interesting notices of the manners of his times, intermixed with details of his personal adventures.

CASAREEP, or Cassiripe, a sauce or condiment made from the juice of the Bitter Cassava or Manioc root. It is in the highest esteem in Guiana, where it is employed to flavor almost every dish; and it is the basis of the favorite West Indian dish called *pepper-pot*. It is a powerful antiseptic, and meat can by means of it be kept for a long time quite fresh, even in a tropical climate. It is made by evaporating and concentrating the juice, which is also mixed with various aromatics. The poisonous principle of the juice is dissipated in the evaporation, so that although the juice in a fresh state is readily fatal to life, the C. is perfectly safe and wholesome. C. is imported into Holland and Britain, and remains unimpaired in quality for several years.

CASAUBON, Isaac de, a great scholar and critic, was born February 8, 1859, at Geneva, where, in 1852, he was appointed professor of the Greek language. Subsequently he held professorships at Montpellier, 1596, and at Paris, 1598, but the death of Henry IV. rendered his position (C. being a Protestant), very insecure, and he therefore gladly accepted the offer of Sir Henry Wotton to visit England. King James received him with distinction, and appointed him some time after prebendary of Canterbury and Westminster. He died in London, July 1, 1614. His acute investigation and criticism were applied to several branches of archæology and theology. Among his chief works may be mentioned the able dissertation "De Satirica Græcorum Poësi et Romanorum Satira" (1605), the treatise "De Libertate Ecclesiastica" (1607), and the "Exercitationes contra Baronium" (1614), a confutation of Cardinal Baronius. His critical and exegetical works include editions of Diogenes, Laertius, Aristotle, Theophrastus, Suetonius, Persius, Polybius, Thoecritus, Strabo, &c.—See "Isaac Casaubon," by Mark Pattison (1875).

His son, MERIC CASAUBON, was born at Geneva, August 14 h, 1599; educated first at Sedan, he accompanied his father to England, and entered Christ Church College, Oxford, where he took his degree of M.A. in 1621. He was appointed rector of Ickham, near Canterbury, 1628, and afterwards professor of theology at Oxford. He died at Oxford, July 14, 1671. His attachment to Charles I. deprived him of all his preferments during the Commonwealth, but at the Restoration he received them again. Meric was, like his father, distinguished for his erudition; edited the works of Marcus Aurelius Antoninus, Terence, Epictetus, &c.; and wrote a treatise, "De Enthusiamos" (Lond. 1656).

CA'SBIN, or Kazvin, a town of Persia, in the province of I ak-Ajemi, 90 miles west-north-west of Teheran. It is situated on an extensive plain of the same name, and is enclosed by walls. Before the time of Shah Abbas the Great, C. was for a brief period the capital of Persia. The plain affords good pasturage, and in the vicinity of the town are extensive vineyards and orchards. The town is very extensive, but a great part of it is now in ruins, owing to its frequent subjection to earthquakes; and the population, which at one time was estimated at 200,000, is now probably not so much as a fifth of that number. Some velvets, brocades, and

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coarse cotton cloth are manufactured; and C. has also a considerable trade in raw silk, rice, &c.

CASCARI'LLA (i. e., little bark, from Span. *cascara*, bark), the name given in South America to many different kinds of bitter medicinal barks which form articles of commerce. Peruvian bark itself bears no other name in the districts which produce it; and the name of C. has recently been introduced in botany for a subdivision of the genus *Cinchona* (q. v.). By European physicians and apothecaries, the name C. Bark (*cortex cascarillæ*) is given to the bark of the *Croton Eleutheria* (see CROTON), a small tree, a native of the West Indies, where it is known as the *Sweet-wood* and the *Sea-side Balsam*. It is imported in considerable quantities into Europe from the Bahama Islands, and appears in commerce in small thin fragments and in quills. It is sometimes employed as a substitute for cinchona, although inferior in tonic and febrifuge qualities. It is a favorite medicine in Germany.—The barks of a number of other species of *Croton* appear to possess properties similar to those of C. Bark.

CASE, in Grammar. See DECLENSION.

CASE, in legal phraseology, though often used as synonymous with Cause, has, both in the law of England and Scotland, separate though not always very definite meanings. A formal written argument, prepared with a view to obtaining the opinion of a court of law, is called a case. By 15 and 16 Vict. c. 86, s. 61, the practice theretofore prevailing in the Court of Chancery of directing cases for a court of common law, is abolished. In Scotland, cases were formerly resorted to in almost every suit of intricacy and difficulty; but the abuse which arose from this practice has been remedied by 13 and 14 Vict. c. 36, s. 14. The statements which are laid before the House of Lords in appeals from Scotland, are cases in the sense now indicated.—In Scotland and Ireland, as in England, questions in dispute can now be stated for the opinion of courts without the usual formality of pleadings, and decided more quickly.

CASE, in Letter-press Printing, a receptacle for types, generally made 34 inches long, 15 inches broad, and 1¼ inch deep, and divided into compartments or "boxes," each of which contains types of one class or letter. A pair of cases consists of an upper and a lower case: the upper one has 98 "boxes," and contains the capitals, small capitals, and some other letters that are only occasionally required in composition; the lower one has 53 "boxes," and holds the letters of the small character, figures, spaces, and most of the points. The places assigned to the several letters of the alphabet in the boxes of the case are not precisely the same in all printing-offices, but the differences are few. When in use, the cases lie on a frame four feet high, and the compositor stands in front of them. The different sizes of the boxes in the lower case depend upon the comparative frequency in which the several letters occur in composition, and the position in the case allotted to each letter is such as to afford the greatest facility in composing. The letter *e*, which is most run upon in the English language, has a box much larger than any of the other compartments, and is placed directly in front of the compositor. In the upper case, the boxes are of uniform size, and the letters are placed in alphabetical order, the comparatively rare occurrence of capitals rendering it immaterial which letter is nearest the compositor's hand. A case will hold a quantity of "letter" equal to 15,000 types.

CASE-HARDENING is the process of converting the surface of certain kinds of malleable-iron goods into steel, thereby making them harder, less liable to rust, and capable of taking on a better polish. Fire-irons, portions of fine grate-fronts, gun-locks, and other articles of limited size, are very commonly so treated, but the process is sometimes applied to large objects, such as iron railway-bars. The articles are first formed of bar iron, and being heated to redness, are sprinkled with a little powdered yellow prussiate of potash, and heated again. The result is, that the heat decomposes the prussiate of potash, and the liberated carbon combines with the iron, forming a coating of steel on the surface of the articles. Another mode of C. is to heat the articles along with some animal matter, such as the parings of horns and a little common salt, from one-half to several hours; the articles are then cooled in cold water, or in oil, when they are of a delicate nature. Charcoal alone is also

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employed. The coating of steel is very thin, seldom exceeding $\frac{1}{16}$th of an inch. Where it is wanted to be thicker, the articles are treated several times. A Swedish iron-master has found that a very excellent case-hardening is obtained by treating iron objects with a mixture of animal matter and arsenious acid dissolved in hydrochloric acid, and heating as usual.

C'ASEINE, or Caseum, is an organic compound allied to albumen (q. v.), found in the milk of the mammalia, and in peas, beans, and other leguminous seeds, when it receives the name of LEGUMIN. The proportion of C. in milk (q. v.) varies, but averages about 3 per cent., and it may be coagulated and separated therefrom by the addition of a little rennet (q. v.) as in the manufacture of cheese (q. v.) or by the employment of a few drops of a mineral acid, such as dilute sulphuric acid. In either case, the C. separates as *curd*, which still retains attached to it some oil and earthy salts, though the greater portion of these substances, along with the sugar, remain in the watery liquid or *whey*. The elementary bodies which enter into the composition of C., and the proportion in which these are present in 100 parts are—carbon, 53·83; hydrogen, 7·15; nitrogen, 15·65; oxygen, 22·52; and sulphur, 0·85. The properties of C. are, that it is not coagulated by heat, as is well evidenced in the heating of milk, but is coagulated on the addition of rennet; sulphuric, hydrochloric, or nitric acids; alcohol, creasote, or infusion of galls, but not by acetic acid. It also forms insoluble precipitates with solutions of the poisonous salts, acetate of lead, nitrate of silver, and bichloride of mercury (corrosive sublimate), and hence the efficacy of taking large doses of milk in cases of poisoning by those deadly salts, as the C. in the milk, forming an insoluble compound with the poison, keeps it from exerting its deadly powers.

The form of C. obtained from plants, and termed legumin, is generally procured from leguminous seeds, like peas or beans, though it can also be extracted from the majority of vegetable substances, especially from sweet and bitter almonds, and even from tea and coffee. Dried peas contain a fourth of their weight of legumin, and this can be extracted by bruising the peas to powder, and digesting in warm water for two or three hours. The liquid is then strained through cloth, which retains the insoluble matters, and allows the water with the legumin dissolved therein, and with starch mechanically suspended, to pass through. On settling, the starch falls to the bottom of the vessel, and the clear liquid holding the legumin in solution, on the addition of a small amount of acetic acid, yields a precipitate of legumin or vegetable caseine. So perfectly does the vegetable C. resemble the C. from milk, that the one can hardly be distinguished from the other by chemical tests or by taste; and at the present time there is regularly prepared in various parts of China, especially near Canton, a form of cheese from peas, which is sold to the populace in the streets of Canton under the name of *Taafoo*. C. is a most important article of food. See NUTRITION.

CA'SEMATE, originally a loophooled gallery excavated in a bastion, from which the garrison could do execution upon an enemy who had obtained possession of the ditch, without risk of loss to themselves. Hence the designation, from Span. *casa*, house, and *matar*, to kill. As defence from shells became more important, the term was subsequently applied to a bomb-proof vault in a fortress, for the security of the defenders, without direct reference to the annoyance of the enemy. A *casemated* battery consists of such a vault or vaults, with openings for the guns. A C. may also serve for barracks, or for an hospital, or for a store-house. The great want of ventilation in casemates renders them bad places for barracks; and the artillerymen are nearly stifled with smoke when firing from such confined places.

CA'SEMENT (It. *casamento*, a large house), a frame with hinges to open and shut, enclosing part of the glazing of a window. Windows of this description are rare in this country, but are almost universal on the continent. Also a name for a deep, hollow, circular moulding, similar to the *scotia* of classical and the *cavetto* of Italian architecture. The C. is very prevalent in the perpendicular style of Gothic architecture, and is sometimes enriched with running foliage.

CA'SERNE is a barrack or building for the accommodation of the soldiers, forming the garrison of a fortified town or post.

CASE'RTA, a town of Italy, in the province of the same name, is situated on a

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plain about 17 miles n.e. of Naples. It is chiefly remarkable on account of its magnificent palace, one of the finest in Europe, and formerly the frequent residence of the Neapolitan court. During 1860, C. acquired celebrity as the head-quarters of Garibaldi and his army. A royal silk manufactory has been established in the neighborhood. Population, with adjoining hamlets, (1872) 29,142.

CA'SE-SHOT, or Canister-Shot, is an assemblage of bullets or small balls, enclosed in a cylindrical case or canister. The diameter of this canister is a little less than the bore of the gun from which it is to be discharged. According to the size of the canister, the balls vary from 1 lb. to ¼ oz. each, from 30 to 280 in number, and from 3½ lbs to 85 lbs. in total weight. The canister bursts immediately on leaving the gun, and the balls spread out into an irregular sort of cone. Within a range of 500 yards, they work great execution among troops; they are generally used at 200 or 300 yards.

In a more modern and effective kind, called *spherical case*, the bullets are enclosed, along with a charge of powder, in an iron shell, instead of a tin canister. It is often called *shrapnel shell*, from the name of its inventor. A spherical case-shot for a 68-lb. carronade, or for an 8-inch howitzer, contains 337 balls; for a 24-pounder gun, 128; and for an 18-pounder, 90. It is exploded by a fuse, the length of which depends on the distance of the point where the destructive effect is to be wrought. Its effect is something like that of a prolonged musket-fire. The shrapnel shell is not of much use against the hull of a ship; but is very destructive against masses of men on shore, or on the decks of a ship, with a greater range than that of ordinary canister. Artillerymen prefer just such an amount of charge as will burst the sphere, without scattering the balls very widely.

CASH (Fr. *caisse*, a chest for containing money) is sometimes used as synonymous with money, as distinguished from produce, in which sense it includes all immediately negotiable paper—bills, drafts, and bonds, as well as coin and bank-notes. At other times, it is used, in a limited sense, to denote coin and bank-notes, as distinguished from negotiable instruments which pass by indorsation.

CASH ACCOU'NT, or Cash Credit, a form of account with a bank, by which a person is entitled to draw out sums as required by way of loan to a stipulated amount. The practice began about 1729 in Scotland, with the banks of which country it is still peculiarly identified; but it is not unknown elsewhere, though on a somewhat different plan. In connection with the Scotch banks, the C. A. system is placed on a distinct and secure basis, which we shall briefly describe. The persons procuring a credit of this kind are for the most part retail-dealers, tradesmen, and farmers, who possess a limited capital, and need occasional loans. Instead of borrowing money by bills or mortgages, they apply to a bank for a C. A. to the extent, it may be, of £500. In the origin of the system, the bank may be said to have been influenced by three considerations—first, the necessity for making advantageous use of its capital; second, the desire to extend its issues of small notes; and third, the nature of the security offered. Since Sir Robert Peel's act restricting circulation of notes, the second of these reasons no longer operates; for the banks are now much above their authorised issue, and must hold an equal amount of coin against the surplus. What the bank particularly wants, is a customer who will be constantly depositing sums in notes of other banks, and drawing out sums in its own notes. The C. A. system aids this process. It secures a customer who will be frequently operating on his account, according to the exigencies of his business, and whose overdraughts, as well as deposits, tend to benefit the concern. Obviously, for the Debtor, the system works more advantageously than when a fixed sum is borrowed, for in that case interest would run on for the whole amount, whereas by a C. A. the trader merely draws what he requires; and by paying in his surplus money in small sums, he is charged with interest only on the sum actually at his debit from day to day. In negotiating a C. A., a bond is prepared by the bank stating the amount and the nature of the security, the cost of which is borne by the borrower. Banks often, in security, accept heritable property and policies of life insurance, but more commonly two persons in good credit become cautioners, or co-obligants along with the principal. Unless the liability of the cautioners, respectively be expressly limited in the bond, each is liable for the whole amount. If the bank liberates one cautioner without the consent of the other, it loses its re-

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course. This recourse is not lost by accepting a dividend from the sequestrated (bankrupt) estate of a principal or cautioner; but it will be lost by accepting a composition from either of these persons without consent of the other. The bank can at any time stop the credit, and call for payment of the balance due. A cautioner can at any time withdraw his name from the credit, on paying up the balance, and the bank is bound to assign the debt to him. While cash accounts may be of great service to traders who act upon them discreetly, it is found that, in too many instances, these accounts are used as a dead-loan to the entire amount stipulated for; and for this, as well as the reason above assigned, banks care now very much less for this kind of business than formerly. Properly, traders are to look on the money procured on cash credits not as an addition to capital, but merely a temporary substitute for current business purposes while the capital is out with customers, and to be replaced accordingly until again required. It may be added, that the progress of commercial wealth in Scotland now greatly lessens the necessity for having recourse to the C. A. system.

CA'SHEL, a town of Ireland, in Tipperary county, and 105 miles south-west of Dublin by rail. It is irregularly built on the south and east slopes of an isolated height, rising abruptly from a rich and extensive plain. Pop. (1871) 4562. C. is a bishop's see, and returns one member to parliament. The ancient kings of Munster resided here. The top of the height, or "Rock of Cashel," is occupied by an assemblage of the most interesting ruins in Ireland, which have a grand effect from the country around. The ruins consist of a cathedral, the largest and most remarkable in the country, founded 1169, burned 1495, and afterwards repaired; a stone-roofed chapel, built 1127 by Cormac MacCarthy, king of Munster, and the most perfect specimen of the kind in the country; Hore Abbey, founded 1260; the palace of the Munster kings; and a round tower, 90 feet high and 56 in circumference. The round tower is built of freestone, but the other ruins of limestone. At C., in 1172, the great synod was held in which the Irish prelates first acknowledged the authority of the English king and church.

CASHEW' NUT (*Anacardium occidentale*,) a tree of the natural order *Anacardiaceæ*, a native probably of the tropical parts of both hemispheres, although it has been commonly regarded as of American origin. It is a spreading tree of no great height. It abounds in a clammy, milky juice, which turns black on exposure to the air, and is used in India for varnishing, but is so acrid as to produce painful inflammation when it comes in contact with the skin of some persons, or when they are exposed to its fumes. Others are comparatively unsusceptible of its influence. The fruit of this tree is a kidney-shaped nut, about an inch long, seated on the thicker end of a pear-shaped fleshy stalk, from which the botanical character of the genus is derived. The shell is double, the outer shell being ash-colored, and very smooth; and between it and the inner is a layer of very caustic black juice. The kernel is oily, and very pleasant and wholesome, and is in common use as an article of food in tropical countries, being made into puddings, roasted, and in various ways prepared for the table. In the West Indies, it is put into wine, particularly old Madeira wine, to which it is thought to communicate a peculiarly agreeable flavor, and for this use it is sometimes imported into Britain. It is also for the same reason sometimes an ingredient in chocolate. Yet the vapor which arises from it in roasting, but which is derived from the coating of the kernel, and not from the kernel itself, is so acrid as to cause erysipelas and other painful affections of the face in those who conduct the process, unless great caution is used.—The fleshy stalk, sometimes called the *Cashew Apple*, varies in size, being sometimes not much larger than a cherry, and sometimes as large as an orange, and is white, yellow, or red. It is perfectly free of the acridity characteristic of the natural order, is acid and eatable, very pleasant and refreshing, and much used by the inhabitants of the countries in which the tree grows. A very pleasant vinous liquor is obtained from it by fermentation; and this by distillation yields a spirituous liquor, highly esteemed for its flavor. A gum which exudes from the bark of the tree, quite distinct from the milky juice already mentioned, is bland, and very similar to gum-arabic.

CASHGA'R, or Kashgar, the political capital of Eastern Turkestan, of which

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khanate—independent of China from 1865 till 1878—Yarkand is the commercial capital. C. stands 140 m. n.w. of Yarkand, in lat. 39° 25′ n., long. 73° 57′ e. It is surrounded by an earthen rampart, pierced with four gates, and is strongly garrisoned. It has manufactures of cotton, gold and silver cloths, carpets, &c.; and an extensive trade with Central Asia. Pop. estimated at 80,000. C. is said to have been an important commercial town before the Christian era, and was possessed for about a century by the Chinese. See YARKAND.—Eastern Turkestan is now frequently called after its capital. See TURKESTAN.

CASHIE'RING is a punishment for officers in the army and navy. It is a severe form of dismissal from the sovereign's service, and implies that the officer, by some disgraceful conduct, has deserved not only dismissal, but disqualification for ever again entering the service. Sometimes there are words added, implying still deeper ignominy and degradation. On some rare occasions, when a court-martial has awarded C., the commander-in-chief has mitigated the punishment to simple dismissal. "Scandalous and infamous conduct," and "Conduct unbecoming the character of an officer, and a gentleman," mark two degrees of offence which may lead, the one to C, the other to dismissal.

CA'SHME'RE, a valley of the Himalaya, between India Proper and Middle Tibet, stretching between lat. 33° 15′ and 34° 35′ n., and long. 74° 10′ and 75° 40′ e. Its bottom, a comparative level of about 2000 square miles, is about 5500 feet above the sea; while the enclosure, as a whole, from ridge to ridge, besides fully doubling the area, attains, at some points, nearly thrice the altitude. The mountain-wall of this secluded region presents but few passes, and most of these too lofty to be practicable in winter. In fact, the Baramula itself does not admit a wheeled vehicle. Through this single opening, situated in the south-west, the Jhelum carries down towards the Punjab the gathered streams and lakes of the entire basin, and is navigable for the last 70 miles of its course. This net work of waters, without swelling into inundations, affords everywhere a perennial supply for the purpose of irrigation. Besides the copious rains of spring, the snows of winter covering even the plains to a depth of two feet for four months, accumulate, in every gorge and on every declivity, reservoir above reservoir, against the demands of summer. C. is traditionally believed to have been a vast upland lake, and alluvial deposits beyond the reach of existing influences would seem to confirm the idea.

In regard to climate, moderate but steady frost prevails from November to March; and again, the heat, ranging from 75° F. in June, to 85° in August, is often disproportionately oppressive, through the stagnation of the landlocked atmosphere. The staple production is rice, which, from the singular facilities of irrigation, is an all but sure crop, yielding, even in a tolerable season, 30 or 40 returns; and in the abundance and excellence of its fruits, C. is said to surpass all the rest of the world. The valley is, in general, considered to be remarkably healthy. The inhabitants, almost universally held to be models of strength and beauty, amounted, before 1828, to 800,000, or to 400 in a square mile. But by casual famine and pestilence they have since been reduced to 200,000. The people are mostly Mohammedans, divided between the Sunnite and Shiite sects. The manufactures—all superior of their kind—are shawls, leather, firearms, and atter of roses. The principal towns are Serinagur, Islamabad, Shupayon, Pampur, and Baramula. The history goes back, through colossal monuments chiefly of marble, beyond the dawn of authentic annals. In 1815, C. first received Mohammedanism; in 1586, it was annexed to the Mogul empire; in 1752, it fell under the power of the Afghans; and in 1819, it was subjugated by the Sikhs. Lastly, being ceded, at the close of the first war of the Punjab, to the British, it was by them transferred to Gholab Sing, as the nucleus of a state of its own name, which comprised also Jamu, Bulti, Ladakh, Chamba, &c. Area of principality, 68,944 sq. miles; pop. 1,500,000.—C. or Srinagar, the capital, lies on the Jhelum, about the centre of the valley. Pop. 15,000. See Bellew's "Kasmir and Kashgar" (1875).

CASHMERE GOAT, a variety of the common goat, remarkable for its very long, fine, and silky hair, from which the highly valued Cashmere shawls are made. It is not so much in Cashmere that this variety of goat is to be found, as in Tibet, from which the finest goat-hair is imported into Cashmere, to be there manufactured into shawls. The hair is even longer than that of the Angora goat, and not, like it,

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curled into ringlets, but straight. It is about eighteen inches long. A single goat does not yield more than three ounces, and the fleeces of ten goats are requisite for the manufacture of a shawl a yard and a half square. The hair is spun by women, and dyed after it is spun. It is said that 16,000 looms are kept in constant employment in Cashmere, producing annually about 30,000 shawls. The shawls are woven in rudely constructed looms, a pair of shawls sometimes occupying three or four men a whole year in weaving. C. shawls, of the finest quality, are sold in London at from £100 to £400 each. Plain shawls are simply woven in the loom, but those with variegated patterns are worked with wooden needles, a separate needle being used for each color. These shawls are in the highest request in India; but the hair of several other breeds of goat inferior to that of Tibet is employed for the manufacture of shawls called by the same name. Imitations of these are manufactured in France rather extensively, some from the Tibet wool entirely, and others of a mixture of this with silk and cotton. It is said that 24 pounds of the best Tibetan goat-hair sell in Cashmere for 20 rupees, or £10 sterling.

Attempts have been made to introduce the C. G. into Europe. Baron Alstroemer attempted, in the end of last century, to naturalise it in Sweden; and a very spirited attempt to introduce it into Britain has recently been made by Mr. Towers. A mixed race, produced by crossing the C. G. and the Angora goat, has been found to possess most valuable qualities, the hair being long, fine, and more abundant than in any of the parent breeds.—The male of the C. G. has very large, flattened, wavy horns.

CA'SIA, or Poet's Casia, (*Osyris alba*), a shrub of the natural order *Santalaceæ*, a native of the south of Europe, 3-4 feet high, with linear-lanceolate deciduous leaves, long, supple branches, numerous small white flowers, and red drupes (stone-fruit) of the size of a pea. The branches are used for making crates. The shrub has been much admired for its modest beauty. Keats speaks of

"The drooping flowers
Of whitest casia, fresh from summer showers."

CASIMIR, properly Kazimierz, was the name of many Polish princes and kings. With the establishment of the power of Casimir I. in 1040, the predominance of Christianity was decided in Poland. But the most distinguished of this name was Casimir III., called Casimir the Great, who succeeded his father Vladislaus Loketek, as king of Poland in 1333. He added Little Russia and Red Russia to his dominions; repelled the Tatars, who then threatened Poland; and waged successful war in Silesia, which he conquered but did not retain. He shewed great anxiety for the advancement of the arts and of learning in his kingdom, and for the improvement of the condition of the most oppressed classes, which won him the title of the King of the Peasants. A Jewish mistress obtained from him liberties for the Jews, which they have since retained in Poland. He died in consequence of the falling of his horse in 1370.

CASI'NO, an Italian dimunitive of *casa*, a house, signifies a place for social reunions. The Italian nobles have long had casinos detached from the palaces in which they live, whither they can retreat and enjoy themselves, and it is probable that the *public* casinos were the result of an attempt made by the middle classes to imitate their superiors. In Italy, a C. is generally close by a theatre, and is a place where musical or dancing soirées are held, containing a conversation-room, billiard-room, and rooms for other kinds of amusement, as well as small apartments where refreshments may be had. Casinos are numerous in Italy and Germany, and have been introduced into England. In general, they are not supposed to exert an edifying influence on the community.

CASINO, or Monte-Casino, a mountain overhanging the town of San-Germano (the ancient Casinum), in the Italian province of Caserta, between fifty and sixty miles north-north-west of Naples, is celebrated on account of the monastery founded here by St Benedict (q. v.) in 529 A. D. This monastery is remarkable for its noble architecture, its ancient wealth, its library and archives, and in modern times for the learning of its monks, who have a printing-press, from which several important works have issued. The beautiful situation of the abbey, and the reputation of the monks as masters of the healing art, formerly made Monte-Casino a favorite resort

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of pilgrims. Luigi Tosti, the librarian of the abbey, has given an account of its literary treasures in his "Storia della Badia di Monte-Casino" (1841—1843), and a most valuable catalogue (1st vol., 1874; 2d, 1876) is in preparation.

CA'SOLI, a town of Italy, in the province of Chieti, situated on a hill 17 miles south of the city of Chieti. Pop. between 5000 and 6000.

CASO'RIA, a town of Italy, 5 miles north-north-east from Naples. Silk is produced in the district. Pop. 8000.

CA'SPE, a town of Spain, in the province of Saragossa, 57 miles south-south-east of the city of that name. It is situated near the Ebro, has manufactures of oil and soap, and a trade in the agricultural produce of the district. Pop. 7500.

CA'SPIAN SEA, an inland sea or great salt-lake, the largest in the world, on the boundary between Europe and Asia, extending from lat. 36° 40′ to 47° 20′ n., and long. 46° 50′ to 55° 10′ e. Its length from north to south is about 700 miles, and its average breadth about 200 miles. Its total area is estimated at 180,000 square miles. The coast-line is irregular, and on the east side especially there are several bays and indentations of coast, the principal being those of Mertvoi, Mangushlak, Kenderlinsk, Karabugos, and Balkan. From the west, the naphtha-impregnated peninsula of Apsheron stretches into the C. opposite the Balkan Gulf; Mount Caucasus also rises on its west side. On the south rises the lofty range of the Elburz Mountains, between which, however, and the coast, on this side almost unbroken, extends a low flat plain of from 15 to 20 miles in breadth. On the north it is bordered by great steppes, and the country eastward is a vast plain. It is probable that at one time its waters, which are said to be still diminishing, covered great part of the adjacent steppes. Some singular changes appear to take place in the level of the Caspian. Various measurements have made its depth and elevation different. One Russian measurement made it 348 feet below the level of the Black Sea, another only 84 feet. The latter is confirmed by Major Wood ("The Shores of Lake Aral," 1876). It has no tides, but its navigation is dangerous because of violent storms, especially from the south-east, by which its waters are sometimes driven for many miles over the adjacent plains. The depth near the southern end is about 600 feet, and in some places near the centre it attains a depth of nearly 3000 feet; but near the coast it is very shallow, seldom reaching a depth of more than 3 feet at 100 yards from the shore, and in many places a depth of 12 feet is not reached within several miles of the beach. On the north-east and east it is especially shallow. It receives the waters of a number of large rivers, of which the greatest is the Volga. The Ural, the Terek, and the Kur also fall into it. The water of the C. S. is salt, but much less so than that of the ocean. Its northern parts are covered with ice during winter. It abounds in fish, and very valuable fisheries are carried on, especially for sturgeon and salmon. By a canal uniting the head-waters of the Volga with the rivers Tvertza and Schlina, the C. is united with the Baltic Sea. It belongs in part to Russia, in part to Persia, and in part to the Turkomans. The Russians have a fleet stationed upon it, and the most of its commerce is in their hands. Steam-packets have been established on it. The chief Russian town upon its shores is Astrakhan, at the mouth of the Volga. Derbend, Gurlev, Baku, and Krasnoi-yar are also Russian towns upon the Caspian Sea. Balfrush, Resht, and Astrabad are Persian towns. The Turkomans have only a few fishing-villages on the eastern shore.

The C. S. was known to the Greeks and Romans. According to Strabo, it derived its name from the Caspii, a tribe inhabiting its western shores. The name Caspian was afterwards limited to the western portion of the lake—the eastern being designated the Hyrcanian Sea.

CASQUE. See HELMET.

CASS, Lewis, an American statesman, born at Exeter, New Hampshire, in 1782. He was educated for the law, but quitting that profession, he entered the army in 1812, and rose rapidly to the rank of general, though his merit was not very conspicuous. In 1813 he was elected governor of Michigan, in which state he settled. During his governorship he kept himself apart from party politics, yet all his measures had a decidedly democratic tendency. In 1831 C. was made minister at war under General Jackson, and in 1836 he was sent as plenipotentiary to Paris. In this

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capacity he made himself popular by his replies, in "Galignani's Messenger," to the attacks of the English press on the claims of the Union with regard to its north-east boundaries, and by his protest against the measures of Guizot; but the treaty concluded by Daniel Webster with Lord Ashburton was so much opposed to the views maintained by C., that he resigned his post, and in 1843 returned to America, where he was received with marks of popular favor. He now aimed at the presidency, and in 1844 was put in nomination, but was defeated, as also in 1848, when he made another effort to obtain the supreme power. In 1857 he was appointed secretary of state, resigning office in 1860. Though active and energetic, he had no claim whatever to anything like comprehensive statesmanship. In regard to slavery, his conduct was ludicrously inconsistent, determined solely, as it would seem, by a view to what would be popular with those whose favor he was seeking to secure at the moment. Latterly, he went wholly along with the slave-holding party, advocating an extension of territory with a view to extend the ramifications of slavery. But he was chiefly remarkable on account of his bitter hostility to Britain, against which he was ever ready to inflame the minds of his countrymen on the slightest and silliest pretext. He is author of the "History, Tradition, Languages, &c., of Indians in the United States;" "of France: its King, Court, and Government;" and other works. He died in June 1866.

CASSA'NDER, king of Macedonia, and son of Antipater, was born about 354 B.C. When young, he is said to have been ill used by Alexander the Great, and to have consequently conceived a mortal hatred to that monarch's family. On the death of his father, he expected to succeed to the regency; but Polysperchon received the honor instead, which so dissatisfied him, that he resolved to contest the sovereignty with his opponent. He was completely successful; but while pursuing his career of conquest in the south of Greece, he learned that Olympias, mother of Alexander, was committing havoc in the north, and consequently hurried back to Macedonia. In less than a year, Olympias was taken prisoner, and put to death. Only Roxana, wife of Alexander, and her son Ægus, now stood between him and the throne of Macedon; but he did not find it convenient to "make away" with these two until several years had passed. Meanwhile, he married Thessalonica, half-sister to Alexander, in whose honor he founded, about 316 B.C., the town which bears her name. In the following year he caused Thebes, which Alexander had destroyed, to be rebuilt. He next became involved in a war with Antigonus, king of Asia, which, with an intervening peace of one year, lasted from 315 to 301 B.C., in the last of which years Antigonus was defeated and slain at the battle of Ipsus. Along with his auxiliaries Seleucus, Ptolemy, and Lysimachus, he seized and shared the dominions of the vanquished. The rest of his life was spent in intrigue and military enterprise. He died 297 or 296 B.C.

CASSA'NDRA, according to Homeric legend, was the fairest daughter of Priam and Hecuba, and the twin-sister of Helenus. The children playing in the court of the temple of the Thymbræan Apollo, not far from Ilium, till it was too late for them to return home, a bed of laurel-twigs was made for them in the temple; and there, in the morning, two snakes were found licking their ears, from which resulted such an acuteness of hearing, that they could hear the voice of the gods. C. afterwards attracted the love of Apollo by her beauty, and he taught her the secrets of prophecy; but displeased by her rejection of his suit, laid upon her the curse that her vaticinations should never be believed. Accordingly, she prophesied in vain of the treachery of the Grecian horse and the destruction of Troy. On the capture of the city, she fled to the temple of Minerva, but was torn from the altar by the Locrian Ajax, and ravished in the temple. She afterwards, in the distribution of the prey, fell to the share of Agamemnon, to whom she bore twin sons, but was murdered by Clytemnestra.

CASSANDRA, a peninsula in the province of Roumelia, European Turkey, situated between the Gulfs of Salonica and Cassandra, in lat. 40° n., long. 23° 30′ e. The ancient name of this headland was *Pallene*. Grain of superior quality is raised here; wool, honey, and wax are produced; and silk-worms are extensively reared. The Gulf of Cassandra (ancient *Toronaicus Sinus*) has a length of 33 miles from south-east to north-west, and a breadth of 10 miles.

CASSA'NO, a town of Italy, in the province of Cosenza, 34 miles north of the

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town of that name. It is situated in a valley in the midst of the most beautiful scenery, has a cathedral, an old castle built on an imposing mass of rock in the midst of the city, and manufactures of linen, leather, silk, cotton, and macaroni. Pop. 8000.

CASSANO, a town of Northern Italy, 17 miles east-north-east of Milan. It is situated on the right bank of the Adda, here crossed by a bridge on the railway to Brescia, and has extensive silk-mills. C. was the scene of two sanguinary battles—one in 1705 between the French under the Duke de Vendôme, and the Imperialists under Prince Eugene, in which the latter were defeated; the other in 1799, when the Russians and Austrians under Suwarow defeated the French under Moreau. Pop. 4500.

CASSATION, Court of. In the law of France, the act of annulling the decision of a court or judicial tribunal is called *cassation*, from the verb *casser*, to break or annul (Lat. *quatere*; Eng. *quash*); and the function of cassation, as regards the judgments of all the other courts, is assigned to a special tribunal called the Court of C., which may thus be regarded, in a certain sense, as the last and highest court of appeal for the whole country. But as everything is excluded beyond the question of whether or not the view taken of the law, and of the proper method of administering it by the inferior tribunal, has been the right one, the idea attached to this institution is less that of a court in the ordinary sense, than of a department of government to which the duty of inspecting the administration of justice is assigned. By the 65th article of the constitution of the year VIII., it was enacted that there shall be "for the whole of France a tribunal of cassation, which shall pronounce on demands for cassation against judgments in the last resort pronounced by the tribunals;" and the following article of the same constitution bears that this supreme tribunal shall pronounce no judgment on the foundation or merits of the cause, but that, in case of its breaking the judgment pronounced, it shall remit to the tribunal appealed from to pronounce another. The title of tribunal was afterwards changed for that or court, by a *senatus consultum* of the year XII.; but substantially the institution has retained its original character, notwithstanding all the changes of government which have occurred in France. The demand for cassation can be made only by the parties to the suit, or by the *procureur-général* of the Court of C. for the public interest. Criminal as well as civil judgment may be reviewed by the Court of C., the only exceptions being the judgments of justices of the peace and of courts-martial, military and naval. The delay allowed for bringing a civil case before the Court of C. is three months for persons domiciled in France, six months for those in Corsica, a year for American colonists, and two for all persons resident beyond the Cape of Good Hope. In criminal matters, the procedure is greatly more prompt, three full days only being allowed to the person condemned to bring his action of C., and the same space being given to the procureur-général. In all criminal and police cases, the Court of C. may pronounce judgment immediately after the expiry of these days, and must do so within a month. The Court of C. is divided into three sections, one of which is devoted to criminal matters. Its staff consists of a president, who has the title of *first* president, and three vice-presidents, who are called presidents; 45 counsellors or ordinary judges; a procureur-général, or public prosecutor; 6 substitutes, who have the title of advocates-general; and several inferior officers. The presidents and counsellors are named by the sovereign for life, the other officers being removable at pleasure. No judgment can be pronounced unless 11 judges are present, the decision being determined by the majority. Where the numbers are equally divided, 5 judges are called in; and cases of peculiar difficulty may be judged of by the three sections united. The whole court, when presided over by the minister of justice, possesses also the right of discipline and censure over all judges for grave offences, not specially provided for by the law. When thus constituted, the Court of C. may suspend the judges of the imperial courts from the exercise of their functions, and call them to its bar. The procureur-général of the Court of C. likewise possesses a surveillance over the procureurs généraux of the imperial courts.

The members of this august tribunal wear a red gown with a violet *toque*, or cap of velvet; the robes of the presidents and of the procureur-général being doubled with white fur.

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CASS'AVA. a West Indian name of the plant also called Manioc (q. v.), and of the starch produced from it, which is otherwise called Brazilian arrow-root, and is popularly known in Britain as TAPIOCA (q. v.).

CASSAY', or Manipu'r a mountainous country in Farther India, to the south-east of Upper Assam, stretching from 23° 49' to 25° 41' n. lat., and from 93° 5' to 94° 32' e. long., and having an area of 7584 square miles. It contains a population estimated at 126,000. It is important to England merely from its being on the Burmese frontier. Accordingly, before the war of 1825 began, it was occupied by the British; and, being permanently ceded at the close of the contest, it was handed over, free from tribute, to the native rajah. The inhabitants are more generally Brahmanists than Buddhists. The productions are tea, rice, tobacco, indigo, cotton, sugar, opium, and mustard; and the manufactures are muslins, silks, and a few iron wares. The chief town is Manipur, which sometimes gives name to the principality.

CA'SSEL, the capital of the former electorate of Hesse-Cassel, now a portion of Prussia, pleasantly situated on both sides of the Fulda, here a navigable river, 120 miles by rail, n.n.e. of Frankfurt-on-the-Main. It contains (1875) 58,043 inhabitants, including military and servants and laborers connected with them. The oldest part of the town consists of a few very narrow, crooked streets, close on the banks of the Fulda; the more modern parts are on hills, which rise gently from the river. C., is partially walled. In Friedrichs-Platz the largest square in any German town stands the Elector's palace, a comparatively mean structure: a little below is the first story of a magnificent palace commenced in 1820, and stopped in the following year by the death of the Elector who projected it. Amongst the other public buildings and institutions, one of the most important is the *Museum Fredericianum*, which has a library of 90,000 volumes and some valuable MSS. The picture-gallery contains about 1400 paintings, including some excellent specimens of the best masters. In the cabinet of curiosities, there are examples shewing the gradual development and improvement of watchmaking from the earliest invention at Nuremberg to the present time. C. contains an observatory, and is the seat of a number of learned and scientific associations. From 1807 to 1813 it was the capital of the kingdom of Westphalia. The gardens of Wilhelmshöhe—which was assigned by the present Emperor of Germany to the late Emperor Napoleon as a residence after his fall at Sedan, in September 1870—with their splendid fountains and cascades, and the colossal statue of Hercules, within the hollow of whose club eight persons can stand at one time, are only three miles from Cassel. There are manufactures of cotton, woollen, and silk fabrics, lace, and carpets. Under the name of *Chasaala*, the town appears to have existed as early as the 10th century.

CASSEL, a town of France, in the department of the Nord, 27 miles north-west of Lille. It is pleasantly situated on a hill, overlooking a country on all sides so flat, that the view, although the elevation is only 800 feet, is said to be one of the widest in Europe, extending over the broad fertile plains of Flanders, and to the chalk cliffs of England, and taking in 32 towns and 100 villages. During the great trigonometrical survey undertaken in the reign of the first Napoleon, Mont Cassel was one of the chief signal-stations. C. has manufactures of lace, linen, thread, hosiery, &c. Pop. (1872) 3069. It was known to the Romans, who had a station here, as *Castellum*.

CA'SSIA, a name given by the ancients to a kind of medicinal bark, but their descriptions are so imperfect that it is impossible to determine what bark it is. The name is employed in the English translation of the Old Testament in Exodus xxx. 24, and in Psa. xlv. 8, its use in these places being derived from the Septuagint; and it is not improbably supposed that the substance intended is the same now known in our shops as *Cassia Bark*, or *Cassia lignea*.—2. *Cassia* is now the botanical name of a genus of plants of the natural order *Leguminosæ*, sub-order *Cæsalpineæ*, containing many species—more than two hundred having been described—trees, shrubs, and herbaceous plants, natives of Africa and of the warm parts of Asia and America. They have abruptly pinnate leaves, and flowers with deciduous calyx of five somewhat unequal sepals, corolla of five petals, of which the lower ones are the larger, ten free stamens, of which three are long, four short, and three abortive, and anthers opening by two holes at the top. The leaves and pods of many species have

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a peculiar sweetish but nauseous smell, and a nauseous bitter taste accompanied with a loathsome sliminess. They seem all to contain the purgative principle called Cathartine (q. v.), and the leaves of some of the Asiatic and African species are highly valued, and much used as a medicine, under the name of SENNA (q. v.). The leaves of *C. Marylandica* possess similar properties, and are now used to some extent in the United States of America.—*C. Fistula* (*Cathartocarpus*) yields the C. of the pharmacopœias, the *C. pods*, *Pipe C.*, or *Purging C.* of the shops. It is a large tree, a native of Egypt and other parts of Africa, perhaps also of the East Indies, in which, at all events, it is now widely diffused and cultivated, as well as in the West Indies and warm parts of America. Its leaves have 4—6 pair of ovate smooth leaflets, its flowers are yellow and in loose racemes; its pods, which have obtained for it the name of *Pudding-pipe Tree*, are sometimes two feet in length, cylindrical, black, consisting of thin brittle woody valves, within which is a cavity divided by numerous thin transverse partitions, each cell containing a single seed imbedded in a soft black pulp. It is this pulp that is the part used in medicine; it has a sweetish mucilaginous taste, and in small doses is a mild laxative. It is sometimes removed from the pods when fresh; or an extract is obtained, after they are dried, by boiling and evaporating. It is said to contain 61—69 per cent. of sugar. The C. pods of the West Indies contain much more pulp, and are therefore more valuable than those imported from the East.—3. *C. Bark*, or *C. lignea*, sometimes called *China Cinnamon*, is a bark very similar to cinnamon both in appearance and properties; but in thicker pieces, and less closely quilled, of a less sweet and delicate flavor, but more pungent. It is the produce of the *Cinnamomum Cassia* or *aromaticum*, a tree of the same genus with the cinnamon-tree, a native of China, and extensively cultivated there. It is highly esteemed by the Chinese, and is now largely imported into Europe. As it contains a greater proportion of essential oil, and is also much cheaper than true cinnamon, it is much more generally used. The oil which it contains is called *Oil of Cassia*, and is very similar to Oil of Cinnamon. Coarse cinnamon is sometimes sold as cassia. *C. Buds* are believed to be the dried flower-buds of the same tree which yields C. bark. They are now imported into Britain in large quantities, and are much used in confectionery. In flavor and other qualities, they resemble C. bark; in appearance, they are very similar to cloves.

CASIA'NUS, Joannes, or Joannes Massiliensis, or Joannes Eremita, a Christian teacher of the ancient church, who flourished in the early part of the 5th c., and distinguished himself as the promoter of monachism in Southern Gaul, and as the opponent of the extreme dogmas of St. Augustine respecting grace and free-will. Shortly before 415, A. D., he went to Massilia (Marseille), where he founded two monasteries according to the rules laid down in his "De Institutis Cœnobiorum." One of these monasteries was for nuns; the other was the famous Abbey of St Victor, which under C. is said to have possessed not less than 5000 inmates, and which served as a model for a multitude of monastic institutions in Gaul and Spain. "His Collationes Patrum Sceticorum" is a work in 24 chapters, each of which gives a "spiritual colloquy between monks in the desert of Sketis," regarding the monastic life, and the vexed questions of theology. C.'s Grecian erudition, his dislike of dogmatic subtilties, and, his zeal for monastic habits, led him to oppose the doctrine of St Augustine on works and grace, and to set up a doctrine which was known by the schoolmen as "semi-pelagianism." See PELAGIANISM. As C.'s doctrine gained support from the Massilian monks, St Augustine, having been informed of it by his friend Prosper of Aquitaine, wrote strongly against it, especially in his treatise "De Gratia et Libero Arbitrio, contra Collatorum." It is not known when C. died; but it must have been subsequent to 433, A. D. The first collected edition of the various works attributed to him was published at Basel, in 1559; the best at Frankfurt, in 1722. The best account of his life and writings is by Wiggers, "De Johanni C." (Rostock, 1824—1825).

CA'SSICAN (*Cassicus*), a genus of birds allied to starlings, having an exactly conical bill, thick at the base, and extremely sharp pointed, the commissure forming an angulated line, the bill ascending on the forehead, and encroaching circularly on the plumage. They are all American birds of gregarious habits, feeding both on fruits and insects, and "exhibiting such surprising skill and ingenuity in the struc-

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ture of their nests, that an old lady once gravely asked an American ornithologist whether he did not think they might be taught to darn stockings!" The Crested C., or Crested Oriole (*C. cristatus*), is a native of Brazil, Guiana, and Paraguay. It is about 20 inches long, is sometimes seen in flocks of 50 or 100, and constructs its nest by knitting together shreds of a thin bark, *Tillandsias*, &c. The nest is about 36 inches long, and resembles a purse or pouch, the lower end hemispherical, and 10 inches wide, and is suspended from the extremity of a branch of a tall smooth-stemmed tree on the outskirt of a forest, apparently to insure safety from monkeys and serpents. Several of these nests are often to be seen hanging from the branches of the same tree.

CASSIDA'RIA, a genus of mollusca—class *Gasteropoda* (q. v.), order *Pectinibranchiata*—with univalve shells, generally regarded as belonging to the family *Buccinidæ* or Whelks (q. v.), but as forming a connecting link with the family *Muricidæ* (see MUREX). The shell is ventricose, with a moderately elevated spire, the aperture elongated, and the canal recurved, but not very abruptly—much less so than in the nearly allied genus *Cassis* (see HELMET SHELL).—the columellar lip covered with a plate, and the outer lip similarly margined within. The recent species, which are not numerous, belong to tropical and subtropical seas. Fifty fossil species have been described. The genus first appears in the upper Cretaceous measures, where a single species occurs. In the Eocene 11 have been found, and about 40 in the Pliocene. It has its fullest development as a recent shell, no less than 70 species being known.

The name *Cassidariæ* is sometimes given to a family of coleopterous insects, of which the type is the genus *Cassida*. See TORTOISE BEETLE.

CASSINI, the name of a family distinguished by their services in astronomy and geography.

CASSINI, GIOVANNI DOMENICO, was born at Perinaldo, near Nice, on the 8th of June 1625, and studied at the College of Jesuits, Genoa. In 1650 he was appointed to the astronomical chair in the university of Bologna. His first work related to the comet of 1652. He subsequently devoted himself to the determination of astronomical refraction, and of the sun's parallax, &c. In 1664—1665 he determined the period of Jupiter's rotation. Subsequently, he determined the periods of the planets Mars and Venus, as also of the *apparent* rotation of the sun. He it was who discovered the third and fifth satellites of Saturn, and afterwards the first and second, as well as the dual character of that planet's ring. He was also the first who carefully observed the zodiacal light; he demonstrated that the axis of the moon was not (as had been believed) at a right angle to the ecliptic, and explained the cause of the phenomenon known under the name of lunar libration. One of his finest observations was the coincidence of the nodes of the moon's equator and orbit. C. died on September 14, 1712, at Paris, whither he had gone in 1669, at the invitation of Colbert, to take charge of the observatory erected by that minister.

CASSINI, JACQUES, son of the preceding, was born at Paris, February 18, 1677. In 1694 he was elected a member of the Academy of Sciences. He travelled in Italy, Holland, and England, where he formed the acquaintance of Newton, Halley, Flamsteed, &c., and was elected a member of the Royal Society of London. On the death of his father, he succeeded to the charge of the observatory at Paris, and died April 16, 1756. C. wrote several treatises on electricity, the barometer, &c. In his treatise, "De la Grandeur et de la Figure de la Terre" (Par. 1720), he attempted to shew that the earth must be a spheroid elongated at the poles. The Newtonians denied this, inasmuch as it was opposed to the ascertained facts of gravitation and rotation, which necessitated the earth's being a spheroid flattened at the poles. As an observer, C. was eminently successful. He determined the periods of rotation of all the satellites of Saturn then known, the inclination of the planetary orbits, the obliquity of the ecliptic very nearly, and the length of the year, &c.—His son, CÆSAR CASSINI, was also engaged in scientific pursuits.

CASSINI, JEAN DOMINIQUE, COMTE DE, the son of Cæsar Cassini, was born at Paris, June 30, 1748. He succeeded to the charge of the observatory, and completed in 1789 the great topographical map of France, begun by his father. But it having been decreed in 1793 that the observatory should no longer be in the hands of one person, three others were in consequence elected to the superintendence of it along

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with C., whose conduct on learning this fact shewed that he had a greater regard for his own dignity than for the whole stellar universe. He refused to have anything more to do with astronomical science, and obstinately kept his purpose through a life that lasted nearly a century, and which was apparently so prolonged to test the durability of a Frenchman's disdain. In his 95th year he published a small volume of poems! He died October 18, 1845.

CASSIODO'RUS, or (according to several MSS.) Cassiodo'rius, Magnus Aurelius, a Latin writer, who distinguished himself by his erudition in an age of barbarism, was born at Scylaceum (now Squillace), in Calabria, about 468 A. D. He was a member of a noble Roman family, and soon attracted the attention of Odoacer by his superior abilities and accomplishments. Under this monarch he held various offices, but after the defeat and murder of Odoacer by Theodoric the Ostrogoth, he passed into the service of the latter. The highest honors now fell upon him; and for years he administered the Ostrogothic power with remarkable prudence and success. In his 70th year, however, he withdrew to Calabria, where he founded the monastery of Tiviers, and employed himself and the other monks in the invaluable work of coppying classical MSS.; his great desire being to improve the education of the clergy. C. was about 100 years old when he died. Besides his grammatical and rhetorical manuals, which were used as text-books during the middle ages, he wrote a very important work, entitled "Variarum Epistolarum Libri XII." This is a collection of state-papers, and is, in fact, the most extensive as well as the most reliable source of information which we possess in regard to everything connected with the Ostrogothic rule in Italy. The style, however, is very peculiar, and shews the influence which the political career of C. had exercised on his language and modes of thought. The editio princeps of the "Variarum" was printed at Augsburg in 1533.

CASSIOPE'IA, the *Lady in her Chair*, a constellation in the northern hemisphere, near Cepheus, and not far from the north pole. It is marked by five stars of the third magnitude, forming a figure like an M. A line from Capella to the bright star in Cygnus passes nearly through the middle of this M. C., according to Flamsteed, contains 55 stars, all of small magnitude. The figure is that of a woman sitting in a chair with a branch in her hand. In the year 1572, there all at once appeared in C. a new star. It was first noticed by Tycho Brahé on the 11th November, when its lustre exceeded that of all the fixed stars, and nearly equalled that of Venus. The star gradually diminished in lustre, from the time of its being observed until, in March 1574, it disappeared. It is said to have alarmed all the astronomers of the age. Tycho Brahé wrote a treatise on it, and supposed—without good reasons—that it had previously appeared in 945 and 1264. Sir John Herschel suggested the possibility of its reappearance in 1972, but his suggestion was not verified.

CASSIQUIA'RÉ, or Cassiquiari, a river of Venezuela, South America, forming the south bifurcation of the Orinoco, which it leaves in lat. 3° 10′ n., long. 66° 20′ w., and after a rapid south-west course of about 130 miles, joins the Rio Negro in lat. 2° 5′ n., long. 67° 40′ w. About 100 yards in breadth when it issues from the Orinoco, it gradually increases until at its union with the Rio Negro it attains a width of 600 yards. By means of this singular river, water-communication is established, through the Amazon, Orinoco, and their affluents, between the interior or Brazil and the Caraccas in Venezuela.

CA'SSIS (Fr., the black currant-tree), a French liqueur prepared from black currants; the manufacture has recently become of great importance. See CURRANT.

CASSITE'RIDES. See SCILLY ISLES.

CA'SSIUS, Longi'nus Caius, one of Cæsar's assassins. At the breaking out of the civil war, though a tribune of the plebs, he sided with Pompey and the aristocratic faction against Cæsar. He was taken prisoner by the latter, who pardoned him, and even made him one of his legates. In 44 B.C., through the influence of Cæsar, he was made *Prætor Peregrinus*, and was promised the governorship of Syria in the following year. But his mean and jealous spirit could not endure the burden of gratitude imposed upon him by the generosity of the dictator, and he resolved to be released by the murder of his benefactor. Having attached to himself the mutinous spirits among the subjugated aristocracy, and also won over M. Brutus, the pseudo-patriotic conspiracy was soon matured, and on the 15th of

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March, 44 B.C., Cæsar fell by the daggers of assasins. The result of this bloody deed was not what C. had expected. The popular feeling—as witnessed by the riots that broke out at Cæsar's funeral—was strongly against the murderers; and the military power fell into the hands of Mark Antony. C. therefore fled to the east, and made himself master of Syria. Afterwards he united his forces with those of Brutus, and having greedily plundered Asia Minor, they crossed the Hellespoint in the beginning of 42 B. C., marched through Thrace, and took up a superior position near Philippi, in Macedonia. Here they were attacked by Antony and Octavian. The division commanded by C. was totally routed, although, on the other hand Brutus succeeded in repulsing the troops of Octavian. C., supposing that all was lost, compelled his freedman, Pindarus, to put him to death. C.'s wife, a half-sister of Brutus, survived him upwards of sixty years. She died in the reign of Tiberius, 22 A. D.

CASSIUS, Purple of, is a coloring substance of very ancient use, which is prepared by adding a mixed solution of protochloride and bichloride of tin gradually to a solution of chloride of gold, when a more or less abundant precipitate of the double stannate of gold and tin ($AuO,SnO_2,+SnO,SnO_2$) is thrown down. The Purple of C. is soluble in ammonia, yielding a very pretty purple solution, from which it can again be obtained, with solid form unchanged, by evaporating the ammonia. Mixed with borax or some fusible glass, Purple of C. is employed by the potter to communicate a rich purple or rose tint to the better kinds of china, and it also imparts the red color to the kind of glass known as *Bohemian glass.*

CASSIVELAU'NUS, a British chief, who fought against Cæsar during his second invasion of the island, 54 B. C. He ruled the country north of the Thames, and had a great reputation as a warrior, but his capital was taken by the Romans, and he himself compelled to flee. He afterwards sued for peace, which he obtained, on condition of paying tribute and giving hostages.

CA'SSOCK, a long loose coat, formerly in common wear, but now usually worn only by the clergy. As worn by the clergy of the Church of England, it is a long coat with a single upright collar. Black is the common color for all orders of the clergy, but on state occasions bishops frequently wear purple cassocks. In the Roman Catholic Church, cassocks vary in color according to the dignity of the wearer—priests wearing black, bishops purple, cardinals scarlet, and the pope white.

CA'SSOWARY (*Casuarius*), a genus of birds nearly allied to the ostrich (see BREVIPENNES and OSTRICH), but distinctively characterised by still greater shortness of wing, by a laterally compressed bill, by a bony crest, by pendent wattles on the naked neck, and by three toes on each foot, all furnished with claws, the inner toe short, and armed with a very long and sharp claw. There are also very important anatomical differences in its digestive organs, which are not adapted to the same coarse diet, for the C. "has short intestines and small coeca, wants the intermediate stomach between the crop and gizzard, and its cloaca does not proportionately exceed that of other birds." Only one species is known, *Casuarius galeatus*, sometimes called Emu by the older naturalists, before that name was appropriated to the Australian bird which now alone receives it. The C. is a native of the Moluccas, New Guinea, and other Asiatic islands, chiefly inhabiting deep forests. In general appearance, it is not unlike the ostrich, but has a much shorter neck. It is the largest known bird except the ostrich, and its height, when erect, is about five feet. It feeds on fruit, eggs, and succulent herbage. When attacked, it defends itself by kicking obliquely backwards with its feet, and by striking with its short wings, the rigid barbless shafts of which, although useless even to aid it in running, are not without value as weapons. There are only about five of them in each wing, somewhat resembling the quills of a porcupine; and at the end of the last joint of the wing there is a spur. The color of the C. is brownish black; the feathers are loosely webbed, and hang down, so that, at a little distance, the bird seems clothed with hair. Those of the rump are 14 inches long, hanging down in place of a tail. The head and upper part of the neck are naked and of a bluish color, and there are two pendent wattles, partly red and partly blue, on the front of the neck. On the breast is a callous bare part, on which the bird rests its body on the ground. The bony

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crest or hemlet reaches from the base of the bill to the middle of the crown, and is about three inches high, exhibiting the most intense blue, purple, and scarlet blended together. The C. lays a few eggs, which it leaves to be hatched by the heat of the sun; and which are greenish, and have a much thinner shell than those of the ostrich. Its flesh is black, tough, and juiceless. The C. is not unfrequently to be seen in menageries in Europe, but is becoming more rare in its native regions, in which it is sometimes kept tame.

CAST, an impression produced by pouring a ductile substance, such as plaster of Paris, into a mould. This method was employed by the ancients in multiplying not only objects of art, such as the small household statues of the gods, but articles of direct utility. The so-called *Celts*, or chisels of bronze, which, with the moulds for casting them, are found in England, Ireland and France, testify to the fact that the art of casting from a mould is one of the earliest acquired by semi-civilized nations. Casts are of incalculable value in familiarizing the eyes of those who can never look on the originals with the grand and beautiful forms of antique art. The best to be had in this country are those executed, and sold on application, at the British Museum. Casting, when applied to metals, is called Founding (q.v.).

CAST, Casting-Line. The casting-line, in Angling, is a gut-line on which the artificial flies are fastened. It is made up of several lengths of gut, knotted together, and usually from two to four yards long. The flies are attached at interva's of about two feet, and the line with its flies is called a *cast*. The term *cast* is also applied to a part of a stream where certain fish may be taken, as a trout-cast, a salmon-cast.

CAST-IRON, or Pig-Iron. This is the crudest form of iron, and the method of its production is described under the head IRON. There are two leading kinds of it —namely, white pig-iron and gray pig-iron; the former is also called forge-iron, from the fact of its being chiefly used for conversion into malleable iron and steel; and the latter is often called foundry-iron, on account of its suitability for castings. Of each of these, again, there are many varieties; and much light has of late years been thrown on what constitutes their different qualities, by experiments in the manufacture of steel. White cast-iron, when smelted from the argillaceous ores of the coal-measures, is of inferior value to the gray; much of it, indeed, being produced against the will of the iron-master, when the blast-furnace is working badly. But when obtained from pure ores and fuel it is the most valuable kind because it contains fewer impurities, and has its carbon nearly all in the combined state, in which case it is best suited for the manufacture of wrought-iron and steel. Gray pig-iron contains carbon both in the combined and the uncombined (graphitic) state. In the grayest kind, uncombined carbon greatly prevails, and the fracture of the iron is more distinctly granular or scaly-crystalline than is the case with other varieties. Such cast-iron is usually called No. 1. It is much softer, but fuses at a higher temperature than white pig-iron. It also becomes thinly liquid when melted, and expands slightly just before cooling—properties which render it extremely valuable for castings. As the grayness and graphite-like brightness diminish, the iron is known as No. 2, No. 3, and so on for several numbers, till we come to the close texture and light color of white pig-iron; No. 2 being but slightly different from No. 1, and No. 5 from white-iron in quality. No. 3 is intermediate between the extremes. When cast-iron is partly gray and partly white, it is called mottled iron. Cast-iron contains from 2 to 5 per cent. of carbon, the maximum amount in steel being 2; but steel is practically free from silicon, sulphur, and phosphorus, while cast-iron is not.

CAST-STEEL. This term, until lately, was confined to steel made by melting Blister-steel (q. v), obtained by the old cementation process. Through this simple operation of melting it in crucibles, which was invented by an Englishman named Huntsman about the middle of last century, steel was first readily made perfectly homogeneous, and fitted for the production of the finer kinds of tools and cutting instruments. The crucibles are made of fire-clay, mixed with a small proportion of the material of old ones and coke. They are very carefully prepared and annealed, but notwithstanding this, the heat of the furnace is so high that they can only be three times used. Each crucible contains from 30 to 40 lbs. of steel, which is poured, when melted, into cast-iron ingot-molds previously smoked. The name "cast-steel," however, can no longer be confined to steel so made, because Besse-

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mer steel, although produced by a quite different process, is truly a cast-steel. In Sheffield, the finer kinds of cast-steel are now sometimes called "crucible steel;" but since puddled steel, which, like the Bessemer, cannot be used for fine cutlery, is also cast in crucibles, such a term is not sufficiently distinctive.

CASTA'LIA, a fountain on the slope of Parnassus, a little above Delphi, in Phocis, sacred to Apollo and the Muses. It was the "holy-water" of the Delphian temple; and all who came to consult the oracle, or visited the place with any religious purpose whatever, were wont to bathe their hair *rore puro Castaliæ* (in the pure dew of C.), but those who wished to be purified from murder, bathed their whole body. The Roman poets feigned that its waters filled the mind of those who drank of it with poetic inspiration. It was imagined to have some connection with the river Cephisus, and to flow from the subterranean Styx. The fountain, whose waters are still pure and delightful as in the days of classical antiquity, now bears the name of St John, from a small chapel of that name close by.

CA'STANETS, a musical instrument of percussion in the form of two hollow nut-shells, which are bound together by a band fastened on the thumb, and struck by the fingers to produce a trilling sound in keeping with the rythm of the music. The *krotalon* of the ancients was somewhat similar. The C. were introduced into Spain by the Moors, where they retain the name of castanulas, from their resemblance to the form of the chestnut. The C. are now much used in the ballet and in the opera.

CASTA'ÑOS, Don Francisco Xavier de, Duke of Baylen, a celebrated Spanish general, was born at Madrid in 1756, and studied in Germany the military tactics of Frederick the Great. For some time after his return to Spain, he had no opportunity of acquiring distinction; but when Napoleon I. invaded that country, C. received the command of a division of the Spanish army, and on the 22d of July 1808, compelled 20,000 French, under General Dupont, to surrender at Baylen. It is asserted, however, that the merit of this prodigious success belonged more to Aloys Reding, a Swiss by birth, and the second in command. In November of the same year, C. was in turn defeated by the French at Tudela. The arrival of Wellington necessarily reduced him to a subordinate position, but he took part in the important battles of Albuera, Salamanca, and Vittoria. In 1811, he was appointed general of the 4th Spanish *corps d'armée*, and commandant of several provinces. In 1815, he was placed at the head of 80,000 troops, destined to invade France, some of which had already crossed the frontier when the news came of the battle of Waterloo. Although no great favorite with the court politicians, his talents could not be overlooked. In 1825 he was called to the state council, where he became a decided opponent of the Carlist party. He died 24th September 1852, at the advanced age of 96.

CASTE, a term applied chiefly to distinct classes or sections of society in India, and, in a modified sense, to social distinctions of an exclusive nature among the nations of the West. When, at the end of the 15th c., the Portuguese began to penetrate to India by the Cape of Good Hope, and to trade with the Deccan or southern portion of the Indian peninsula, they found arbitrary social laws, full of intricate regulations which constantly interfered with their intercourse with the natives, especially in matters involving the *subdivision of labor*. They found certain pursuits invariably followed by a certain class, and any attempt to induce a man to perform offices not appointed for the class of which he was a member, met with violent opposition, though such offices might, according to European notions, be more honorable than many he was content to fulfil. They observed, also, that these different classes often varied in appearance, the result, in some cases, of their addiction for many generations to the same pursuits; in others, of their having actually arisen from a different stock. Hence they applied to these various divisions of society the term *casta*—a Portuguese and Spanish word, meaning a breed. As applied to these classes of Hindu society, the word has passed into most European languages. From its frequent use in India, it has sometimes been erroneously considered of Hindu origin.* Of late, it has been spelled *caste*, and by old authors

* In Sanscrit, castes are called *Varnas*, i. e., "colors;" color being, no doubt, the chief distinction at first.

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cast; and it is even a question, whether the word may not be as genuine English, as *casta* is Spanish.

In the South of India, the Portuguese became acquainted with what is considered the most exaggerated evil of caste. There are found there large numbers of a class called *Pariahs*, or, in other districts of India, *Chandalas*. They are probably the relics of some early conquered race, who have been degraded by uninterrupted ages of oppression, as is represented to have been the case with the Helots of Sparta, and people in a similar condition. These Pariahs were always identified with outcasts—i. e., persons who had forfeited the privileges of their original order. No one of any C. would have any communication with them. If one of them even touched a Nayr, or warrior of high C., he might with impunity kill him. Some sorts of food were defiled by even their shadow passing over them; and the name of Pariah or Chandala conveyed to the Hindu the idea of the utmost vileness and disgust. All who violated the institutions of their class were held to sink into this class—a condition which involved the loss of all human respectability and comfort. These regulations were, moreover, referred to religion.

As India was at this time the land of the marvellous, and its inhabitants, though as various as the different nations of Europe, viewed as one homogeneous people, what was only true of one portion of the peninsula, was considered as prevailing everywhere, and as identical with the divisions of the Indians into *seven* tribes or castes, mentioned in olden times by Strabo, by Diodorus Siculus, and by Arrian. Nor was it forgotten that the Egyptians, whose early civilisation was as undoubted as that of India, were also divided, according to Herodotus, into seven classes of priests, warriors, herdsmen, swineherds, tradesmen, interpreters, and pilots, to each of which were assigned particular districts.

About the middle of the 16th c., however, Abraham Roger, chaplain of the Dutch factory at Pulicat, gained the confidence of a Brahman, acquainted with the Sanscrit language, and by this means learned pretty exactly the account of the origin of C. given in the "Laws of Menu," a work inferred to have been written not later than 900 B.C., which was long known only by name in Europe, until about the end of the last century, when a copy was obtained, and translated by Sir William Jones. The whole of the Hindus are represented by Menu as divided into four classes.

1. The *Brahmans* or *sacerdotal class*, who are said, at the moment of creation, to have issued from the *mouth* of Brahma. Their business is reading and teaching the Vedas, and the performance of sacrifice for themselves and others. They are to be the chief of all created beings; the rest of mortals enjoy life through them. By their imprecations, they can destroy kings, with all their troops, and elephants, and pomps. Indra, when cursed by one of them, was hurled from his own heaven, and compelled to animate a cat. Hence, the Brahman is to be treated with the most profound respect, even by kings. His life and person are protected by the severest laws in this world, and the most tremendous denunciations for the next. His own offences are treated with singular lenity; all offences against him with terrible severity. He is forbidden to live by service, but on alms; and it is incumbent upon virtuous men and kings to support him with liberality; and all ceremonies of religion involve feasts and presents to him. The first part of his life is to be devoted to an unremitting study of the Vedas—books, be it observed, older than the code of Menu, and yet, except, perhaps, one of the latter hymns, containing no mention of C. as a religious ordinance. He is to perform servile offices for his preceptor, and beg from door to door. In the second quarter, he lives with his wife, reads and teaches the Vedas, assists at sacrifices, and, "clean and decent, his hair and beard clipped, his passions subdued, his mantle white, his body pure, with a staff and a copy of the Vedas in his hand, and bright golden rings in his ears," he leads a studious and decorous life. The third quarter of his life he must spend in the woods, as an anchorite, clad in bark, without fire, wholly silent, and feeding on roots and fruits. The last period he is released from the external forms and mortifications, and is to spend his time meditating on the divinity, until at length he quits the body, "as a bird leaves the branch of a tree, at pleasure."

2. The *Kshatrya*, or *Chuttree*, or *military class*, sprang from the *arm* of Brahma, and bears something of a sacred character. It is stated that the sacerdotal order cannot prosper without the military, or the military without the sacerdotal; and the prosperity of both, as well in this world as in the next, is made to depend on their cordial union. The Kshatrya are to give alms, to sacrifice, to read the Vedas,

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and defend the people. Though Brahmans are to draw up and interpret laws, they are carefully excluded from administering them. The *executive* government is vested in the Kshatryas alone.

3. The *Vaisya*, or *Bais*, or *mercantile class*, sprang from the *thigh* of Brahma. Their grand duties are to keep cattle, carry on trade, lend on interest, cultivate the soil, and turn their attention to every description of practical knowledge. They are to be perfect men of business.

4. The *Sudras*, or *Sooders*, or *servile class*, came from the *foot* of Brahma. They are to serve the three superior classes, more especially the Brahmans. Their condition is never to be improved; they are not to accumulate property, and are unable by any means to approach the dignity of the higher classes. Utter and entire submissiveness to the Brahmans is the spirit of all a Sudra's duties, and this is to be enforced by penalties as severe as they are ridiculous. Yet, withal, the Sudras were not to be slaves, either public or private, and to occupy a position much higher than the Chandalas.

Mixtures of castes, though not absolutely forbidden, entails disadvantages on the children, and the offspring of a Brahmanical woman and a Sudra becomes a Chandala, or outcast.

Such—omitting the minute and childish laws and penalties, many hundreds in number, by which it is proposed to carry the principle of C. into the pettiest affairs of life—is a brief outline of it, as gathered from the code of Menu. There is no historical evidence that it ever existed in this form, and, from the nature of the case, we may conclude that it never did. In the "Toy-cart," the oldest Hindu drama, no extravagant veneration for Brahmans anywhere appears. In fact, one of them is condemned to death; and the arrangements of society appear to have been the same as at present. The laws of C. form, it is true, a part of what is reputed to be Hindu law, but they have remained in all the states of India, Hindu as well as Mohammedan, to a great extent a dead-letter. There is nothing to shew that the code of Menu was drawn up for the regulation of any particular state. Some have even conjectured that it may have been the work of some learned man, designed to set forth his idea of a perfect commonwealth, under Hindu institutions, just as Plato in "The Republic" gives us his idea of a model government under Greek institutions.

Be this as it may, the C. which at present exists throughout the greater part of India is very different from that described in the code of Menu, though to this it owes, no doubt, much of its stability and its importance in the eyes of Europeans. With the exception of the Brahmans, the pure castes have disappeared, and out of the intermixture of the others have sprung innumerable classes, many of them unauthorised except by the people themselves. So engrained in the whole community is this tendency to class distinctions, that Mussulmans, Jews, Parsees, and Christians fall, in some degree, into it; and even excommunicated or outcast Pariahs form castes among themselves. Most of the existing castes partake of the nature of associations for mutual support or familiar intercourse, and are dependent upon a man's trade, occupation, or profession. Many of them have been described by Mr Colebrook in the "Asiatic Transactions," vol. v. Many have had their origin in guilds, in schism from other castes, in the possession of a particular sort of property (as, for instance, landlords are spoken as the C. of *zemindars*), and similar accidental circumstances. Their names are often due to the district in which the C. took its rise, to their founder, to their peculiar creed, or any random circumstance. In the Bengal presidency, there are many hundreds of such castes, almost every district containing some unknown in those adjacent. Among the lowest classes, and especially among the servants of the English at Calcutta, it has degenerated into a fastidious tenacity of the rights and privileges of station. For example, the man who sweeps your room will not take an empty cup from your hand; your groom will not mow a little grass; a coolie will carry any load, however offensive, upon his head, but even in a matter of life and death, would refuse to carry a man, for that is the business of another caste. Such and many other regulations are described in every work on C., but are as unworthy of serious regard as are the assertions of self-importance found among little people all the world over. When an English servant pleads that such a thing "is not his place," his excuse is analogous to that of the Hindu servant when he pleads his caste. When an Englishman of

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birth or profession, which is held to confer gentility, refuses to associate with a tradesman or mechanic—or when members of a secret order exclude all others from their meetings—or when any other similar social distinction arises, it would present itself to the mind of the Hindu as a regulation of caste.

Nor does C., at the present day, *tie a man down to follow his father's business*, except, perhaps, in the case of the more sacred functions of the Brahmans. For the rest, Brahmans serve as soldiers, and even as cooks. Men of all castes have risen to power, just as in England our statesmen have sprung from every class of society. Nor, again, is loss of C. anything so terrible as has been represented; in most cases it may be recovered by a frugal repast given to the members of the C.; or the outcast joins another C., among whom he will commonly be received with the heartiness due to a new convert. The question of the restoration of a Christian convert wishing to rejoin the Brahmanical C. has been differently decided by his fellow caste-men in different places.

As in the West, so in the East, C. enters into all the most ordinary relations of life, producing laws often most tyrannical and too anomalous to admit of generalisation. In the West, however, whilst good sense and Christianity have ever tended to ameliorate social differences, the feeble mind of the Hindu and the records of his religion have had a contrary effect.

These modified views of C., which have begun to prevail in recent years, will be found more fully developed in Shore "On Indian Affairs," Irving's "Theory and Practice of Caste." Full accounts of the petty regulations of C., as laid down in the code of Menu, may be seen in Sir William Jones's "Translation of the Code of Menu," Robertson's "Disquisition on India." Richard's "India," Elphinstone's "History of India," Dubois's "India," Colebrooke's "Asiatic Transactions," vol. v., and in various articles in the "Calcutta Review." The most authoritative account of the subject of caste is to be found in the first volume of Dr John Muir's "Original Sanscrit Texts on the origin and Progress of the Religion and Institutions of India; collected, translated into English, and illustrated by Notes" (5 vols. Lond. 1867—1871; vols. 1 to 4. new ed.), a work of the utmost value.

The question how C. is to be dealt with in converts to Christianity, has now been determined by common consent of missionaries in India; and it receives no recognition within the Christian church. An opposite policy, in former times, founded on the opinion that C. might be regarded as merely a civil or social institution, and not as a part of the religion of the Hindus, is now believed to have been among the principal causes of the comparative decay of the churches or congregations founded during the 18th c. in the south of India.

CASTE'GGIO, or **Montebello**, a town of Piedmont, Northern Italy, 5 m. e.n.e. of Voghera. In the campaign of 1859, C. was occupied by Austrians prior to the battle of Montebello, in which they were defeated by the French and Sardinians. C. was also valorously but unsuccessfully defended by the Austrians in the great battle of Montebello between them and the army of Napoleon I. in 1800. As *Clastidium*, C. was an important military position as early as the times of the Gallic and Punic wars. Some Roman antiquities still remain, and numerous curious inscriptions and coins have been found. Pop. 3206.

CASTE'L (from the Latin *castellum*) is a name prefixed to various places in Italy, France, Spain, Portugal, &c., of which the most important are:

1. C.-**Arquato**, a town of Parma, North Italy, 19 miles south-east of Piacenza, picturesquely situated amid forests and vineyards, with a fine Gothic church and a noble old castle, from which the town derives its name. It has manufactures of silk, and a population of 4400.

2. C.-**Bolognese**, a town of North Italy, about 22 miles west-south-west from Ravenna. It derives its name from a strong fortress built here by the Bolognese in the 14th c.; and is historically famous as the scene of a decisive battle between the Milanese and Florentines in 1434, in which the latter were completely vanquished.

3. C.-**Buono**, a town of Sicily, in the province of Palermo, eight miles south-east of Cefalu. It is noted for its mineral springs, and has a trade in manna. Pop. 5288.

4. C.-**Franco**, a town of Central Italy, eight miles east of Modena, with the old walls and ramparts of a castle built by Urban VIII., and near the site of the battle between the consuls Hirtius and Pansa and Mark Antony.—Also the name

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of a town of Italy, in the government of Venice, about 25 miles north-west from the city of that name, with linen and woollen manufactures, and a population of 4220.

5. C.-GANDOLFO, a village of the former Papal States, 11 miles south-east of Rome, near the west shore of Lake Albano. Its situation is extremely picturesque, and it commands extensive views of some of the most beautiful scenery in Italy. The pope has his summer residence here. In early times, the noble family of the Savelli had a stronghold at C., by means of which, for a period of nearly 400 years, they bade defiance to popes, barons, and *bourgeoisie*. Pop. 1144.

6. C.-SARDO (formerly *C. Aragonese*), a fortified town and seaport, the strongest on the island of Sardinia, is situated on a steep rock on the north coast, 16 miles north-east of Sassari. The environs produce wine. Pop. 1946.

7. C.-SARRASIN, a town of France, in the department of Tarn et Garonne, on the Songuine, 12 miles west from Montauban. It has the remains of an old castle said to be of Saracenic origin, a population in 1872 of 2967, manufactures of serge and worsted stockings, and a trade in the agricultural produce of the district.

8. C.-TERMINI (ancient *Camicianæ Aquæ*), a town of Sicily, in the province of Gigenti, and 16 miles north from the city of that name. It has extensive mines of rock-salt and sulphur, and a population of 8200.

9. C.-VETRANO, a town of Sicily, in the province of Trapani, 20 miles south-east of the town of that name. It is an interesting place with an old castle, several convents, manufactures of articles of coral and alabaster, and a population in 1872 of 20,420. Some of the most esteemed white wine of Sicily is produced in the vicinity.

CASTELLAMARE, a fortified city and seaport of South Italy, about 17 miles south-east of the city of Naples. It is built on the lower slopes of Monte d'Auro, and along a sheltered beach on the south-east side of the Gulf of Naples, over which it commands a magnificent view. It is on or near the site of the ancient *Stabiæ*, which was desolated by Sylla during the Social War, and where the elder Pliny afterwards lost his life when the city was overwhelmed with lava from Vesuvius. Some ancient remains have been found here. The town was sacked in the 15th c. by Pope Pius II., and again in the 17th c. by the Duc de Guise. It has a royal palace, a cathedral, several convents, among which that founded by Gonsalvo de Cordova, in the 16th c., is famous for the possession of an image of the Madonna, found in a well in the 11th c., which is greatly venerated by the peasantry, who make an annual pilgrimage to the church. The old castle, which gave name to the town, was built in the 12th century. C. has a royal dockyard, affording employment to many of the inhabitants, and manufactures of linen, silk, cotton, leather and sail-cloth. Pop. 20,488.—CASTELLAMARE is also the name of a town in Sicily, situated at the head of a gulf of the same name, and 20 miles east from Trapani. It has a population of 11,280, and exports of cotton, wine, fruit, and manna.—C., GULF OF, is an extensive bay on the north coast of Sicily. Its width from east to west, between Point Uomo Morto and Cape St. Vito, is about 15 miles; and its depth about 14 miles. It has deep water and good anchorage, but is much exposed to north winds.

CASTELLAMONTE, a town of North Italy, in the province of Turin, 10 miles south-west of Ivrea. It has an old castle, manufactures of earthenware, and a trade in the agricultural produce of the district. Pop. 5641.

CASTELLAN, or Châtelain, the keeper of a castle or *burg* in the middle ages. The office and the rank of the C. were various in various countries. In France and Flanders, the title C. belonged to the holders of certain demesnes, and was next in order of rank to that of a bailiff. In Germany, the C. had the jurisdiction of a Burg-graf during the ages of chivalry. In Poland, the title of C., with its appendages, remained in later times, and, after the 16th c., the castellans, with the waiwodes and bishops, formed the senate or superior legislative chamber.

CASTELLANA, a town of South Italy, in the province of Bari, and 26 miles south-east of the city of that name. Its trade is confined to the produce of the district. Pop. 9691.

CASTELLANETA, a town of South Italy, in the province of Lecce, 20 miles north-west of Taranto. It has a cathedral and several convents. Cotton is grown in the district. Pop. 8358.

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CASTELLA'ZZO, a town of North Italy, about 5 miles south-west of Alessandria. Pop. 5749.

CASTELLEO'NE, a town of Lombardy, North Italy, situated near the Oglio, about 12 miles north-north-west of Cremona. It is surrounded by old walls, has a fine church, and a population of 5700.

CASTELLIO, or Castalio, Sebastianus, a theologian, born in Dauphiné in 1515. His proper name was *Châteillon*, which he Latinised, according to the usage of his time. About 1540, he was invited to Geneva by Calvin, and appointed Humanity professor; but having the misfortune, afterwards, to differ from the reformer in religious opinion, he was banished from the city, and went to Basel, where he spent the rest of his life in great poverty. He died in 1563. See CALVIN.

Among his various writings may be mentioned "De Hæreticis," &c.—a treatise which argues against the right of the magistrate to punish heretical opinions, and which produced a reply from Beza; a Latin version of the Old and New Testaments, published in 1551, and dedicated to Edward VI. of England; and a posthumous work, in dialogue, on predestination, election, free-will, and faith, first published by Faustus Socinus in 1578.

CASTELLO'N DE LA PLA'NA, a town in Spain, capital of the province of the same name, is situated in the midst of a fruitful plain, about 4 miles from the Mediterranean, and 40 miles north-north-east of Valencia. A magnificent aqueduct supplies the means of irrigation. C. is surrounded by walls, and is for the most part well built. It has some handsome old churches, and a singular bell-tower 260 feet high. Ribalta, the celebrated Spanish painter, was a native of Castellon de la Plana. It has manufactures of linen, woollen, sail-cloth, paper, earthenware, and firearms; also brandy distilleries, and an active trade. Pop. 20,000.

CASTELNAUDARY, a town in the department of Aude, France, situated on a declivity, skirted at the base by the Canal du Midi, 22 miles from Carcassone. Pop. (1872) 7721. It has manufactures of woollen and silk fabrics, and earthenware, and carries on a lively trade in agricultural produce. The canal at this point expands into a large basin, which serves as a haven. It suffered dreadfully in the crusade against the Albigenses, and was, in 1212, the scene of a battle between Simon de Montfort and Raymond, Count of Toulouse. In 1355, it was captured by the Black Prince. In 1632, Marshal Schomberg here gained a victory over the party of the Duke of Orleans, when the brave Duke of Montmorency was taken prisoner, and afterwards executed at Toulouse.

CASTELNUO'VO, a seaport town of Dalmatia, Austria, situated near the west entrance of the Gulf of Cattaro. It is surrounded by walls, and defended by two forts and a citadel. It has manufactures of brass, and a trade in the produce of the district, which is fertile. It was captured by the British in 1814. Pop. including commune, (1869) 6105.

CASTIGLIO'NÉ, Lake of, a lagoon of Central Italy, in the province of Siena. It lies north of Grosseto, and has a length of about 10 miles, with a breadth of from 1 to 3 miles. Receiving the waters of the Bruna and other rivers, it discharges its water by a short canal into the Mediterranean.

CASTIGLIO'NÉ, a town of Sicily, province of Catania, on the north slope of Mount Etna, on the right bank of the Cantara, 35 miles south-west of Messina. The town stands on a square rock rising abruptly from the valley, and having a double crest, on which stand a domed church and the ruins of a feudal castle. Here, in 1297, in the war of the Vespers, Admiral Roger Toria raised the standard of rebellion against his sovereign, Frederick of Aragon. In the district are several large nut plantations, which produce the best Sicilian hazelnuts. Pop 8000.

CASTIGLIO'NE, Baldassa'rre, Count, one of the most elegant of the old Italian writers, was born, 1478, at Casatico, in the duchy of Mantua, and studied at Milan. His shining talents, knowledge, and pleasing manners made him a favorite of Guidobaldo di Montefeltro, Duke of Urbino, a great patron of literature, at whose court he was honorably entertained, along with other men of eminence in letters. He was employed by the duke as envoy to Henry VIII. of England, who made him a knight; and was afterwards sent in the same capacity to Louis XII. of France,

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under Guidobaldo's successor, in several important ambassadorial missions. He died at Toledo in 1529. His chief work is the book "Del Cortegiano," a manual for courtiers, remarkable for its elegant style. His Italian and Latin poems are also models of elegance, and his "Letters" (2 vols., Padua, 1769—1771) contain interesting contributions to the political and literary history of his time. Tasso devoted a sonnet to the death of C., and Giulio Romano raised to his memory a monument in Padua.

CASTIGLIO'NE, Carlo Ottavio, Count, an eminent Italian philologist, was born at Milan in 1795. At an early period, he displayed a predilection for antiquarian studies, more particularly numismatics. When only 24 years of age, he published a description of the Kufic coins in the cabinet of Brera, at Milan, under the title, "Monete Cufiche del Museo di Milano" (Milan, 1819), which shewed a great knowledge of oriental languages and history. C.'s principal work in the sphere of oriental literature is his "Mémoire géographique et numismatique sur la Partie orientale de la Barbarie appel e Afrikiah par les Arabes, suivi de Recherches sir les Berbères Atlantiques" (Milan, 1826), in which he seeks to ascertain the origin and the history of the towns in Barbary whose names are found on Arabic coins. Out of Italy, C. is perhaps best known by his edition of some fragments of the Mœso-Gothic translation of the Bible by Ulphilas (q. v.), which had been discovered, in 1817, by Cardinal Mai among the palimpsests of the Ambrosian Library. At first, he published some specimens in conjunction with Mai, but in 1829, 1834, 1835, and 1839, appeared a variety of fragments of the Pauline epistles, edited by himself, and enriched with valuable disquisitions, commentaries, and glossaries. He died at Genoa, April 10, 1849.

CASTIGLIO'NÉ DE'LLÉ STIVIE'RÉ, a town of North Italy, 22 miles north-west of Mantua. It is walled, and defended by an ancient castle; but is chiefly celebrated on account of the victory obtained here by the French over the Austrians in 1796, and which gave the title of Duc de Castiglione to Marshal Augereau. Pop. 3716.

CASTI'LE (Spanish, CASTI'LLA) forms, in a geographical and political point of view, the central district of the Spanish peninsula, being the middle and most strongly marked plateau of Spain, as well as the central seat of the monarchy. Both geographically and politically it is divided into Old and New Castile—*Castilla la Vieja* and *Castilla la Nueva*. The former district, situated in 40° 5'—43° 32' n. lat. and 1° 40'—5° 35' w. long., rises, in the form of an elevated plateau, to the height of 2500—3000 feet. It is walled in on all sides: on the north, by the highest masses of the Cantabrian Mountains, which separate it from the Basque provinces and Asturias; on the south, by the high ridge forming the water-shed between the Douro and the Tagus; while the Sierras de Oca, de Urbion, and Moncayo, and the heights of Leon and Tras-os-Montes bound it on the east and west. The high plateau of old C. is but scantily watered, and its natural characteristics far from inviting. In many parts, nothing is presented to the eye but a wide, unwooded, almost treeless waste of land, unrefreshed by streams, in some parts monotonously covered with stunted grasses, and in others, almost destitute of vegetation. The traveller may walk many miles without finding a village, or even a solitary farm-house. All Old C., however, is not a dusty desert. There are rich tracts in it producing some of the finest wheat in the world. Madder and grasses are also produced abundantly in some parts; and even the olive flourishes where it is protected from the frost and snow of winter, and from the cold winds prevailing in October and the following months. Iron and other minerals exist in plenty, but are not worked to any great extent. Sheep, cattle, pigs, and mules form the chief wealth of the inhabitants. Manufactures consist of coarse woollens, cotton, linen, leather, and glass.

The plateau of NEW CASTILE—which is situated between lat. 38° 23' and 41° 15' n., and long. 1° and 5° 25' w.—like Old C., is also enclosed by mountains. Though lying 1800 feet lower than Old C., New C. presents many similar characteristics of soil and scenery. It is mostly sterile, and scantily irrigated; little rain falls, and the nightly dews are insufficient to refresh the plains, which are entirely destitute of trees, and, in summer, appear quite burned up. Olives, corn, pulse, and saffron, are cultivated in some neighborhoods; but flocks of sheep constitute the chief wealth of extensive tracts of land. The commerce, carried on by means of long trains of

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mules, reminds the tourist of the caravan-traffic over eastern deserts. Industry is almost entirely restricted to manufactures of coarse woollen goods. The yield of the salt-mines in the south is considerable; and quicksilver, especially at Almaden (q. v.); and iron (manufactured at Toledo) are plentiful. The Castilians have even more than the general haughtiness of the Spanish character. Their language prevails throughout the educated classes, as in the literature of Spain, and their rulers have extended their sway over the whole nation.

In the present administrative division of Spain into forty-nine provinces, the division of Old and New C., though it will long be remembered by the people, is one belonging to past history. Old C. is now divided into the eight provinces of Burgos, Logroño, Santander, Soria, Segovia, Avila, Palencia, and Valladolid. The population, distributed over an area of 22,797 square miles, amounted, in 1870, to 1,689,864. New C. includes the five provinces—Madrid, Guadalaxara, Cuença, Toledo, and Ciudad Real, and on an area of 30,882 square miles, has 1,541,772 inhabitants. Besides these provinces, the kingdom of Leon, Galicia, the principality of Asturias, and the districts of Estremadura, Andalusia, Granada, and Murcia, belonged to the crown of Castile.

C. first became an independent country in 762, and remained so until 1028, when it passed to Sancho III., king of Navarre. His son, Ferdinand I. (Great), founded the kingdom of C., and among other acquisitions annexed to it the kingdom of Leon. This union, however, was not permanent, Leon being made a separate kingdom for Ferdinand II. The two kingdoms, however, were afterwards reunited in the 13th c., in the person of Ferdinand III., and remained ever after under one sceptre. Among the successors of Ferdinand III., the most distinguished was Alfonso X., by whose direction the Alfonsine (astronomical) tables were drawn up. By the marriage of Isabella, sister and successor of Henry IV., with Ferdinand, king of Aragon (1469), the two crowns of C. and Aragon became united (1479), and from these sprang the kingdom of Spain, which, however, was not fully established before the death of Ferdinand, in 1516, when Charles I. of Spain (Charles V. Germany) inherited both crowns.

CASTILLON, a town of France in the department of Gironde, situated on the right bank of the Dordogne, 26 miles east of Bordeaux. It has manufactures of cotton and woollen yarns, nails, and cordage. It is celebrated as the scene of the battle between the forces of Henry VI. of England and Charles VII. of France, July 1453, in which the English met with a signal defeat, their leader, the Earl of Shrewsbury, and his son, being slain. Of all their possessions in France, Calais alone remained to the English after this battle, the incidents of which were seized on by Shakspeare for the sixth scene in his play of "King Henry VI.," Part I. Pop. (1872) 3328.

CASTING, in Angling, is the term applied to the act of throwing a fly or a fish-bait. In casting a fly with a single-handed rod, the beginner should let out about as much line as the length of the rod; grasp the rod just above the reel; then wave it back over the right or left shoulder, with a slightly circular sweep, so as to extend the line behind; and then bring it forward with a steady cutting kind of action, arging the point of the rod towards the spot where the fly is to fall, taking care not to carry the point of the rod too far forward, or too low, or the line will not fall straight and evenly on the water. The object of the circular sweep behind is to prevent the fly from cracking off. By slightly raising the point of the rod just as the fly is delivered, the line is straightened; and the fly, checked in mid career, falls like thistle-down upon the water. Always allow time for the line to go straight out behind, for if returned too quickly, the fly cracks off. In casting with the double-handed rod, the one hand grasps the rod above the reel and the other below it, the lower hand acting as a pivot upon which the rod turns.

In casting a bait, either for spinning, trolling, or live-baiting, the bait is suffered to hang from the point of the rod about a yard. Taking the rod in both hands, the line clasped to the rod in his right, the angler waves the bait gently back; and having first drawn as much line as he requires off the reel, and laid it loosely at his feet, he sends the bait forward with a swing towards the point he desires to reach.

CA'STING-NET, a species of net very widely distributed, having been found in use amongst various savage tribes in different parts of the world, some of whom,

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from long and constant practice, use it with a dexterity and address unknown in England. The nets used in England are usually from 1: to 20 feet in circumference when spread out. They are netted in the shape of a kind of long loose bag or cone; and so much is the number of meshes increased as the net progresses, that it is capable of being spread out in a perfectly flat and circular form, the apex of the cone forming the centre of the circle. To this apex is attached a rope of some yards in length; when casting, this rope is fastened round the left wrist of the caster. The bottom of the net, which forms, when it is held up by the apex, the base of the cone, or, when spread, the circumference of the circle, is hung around with perforated leads or bullets. These have not only the effect of carrying the net to the bottom of the water, but also, when it is cast, of causing the net to spread open. The bottom of the net is turned up some six inches or more in depth, and hung up on the inside about every ten inches or so, to an upper portion of the net, by stout strings, so as to form a kind of purse; this is called the "tuck." When the net is required to be cast, the caster, having fastened the rope to his wrist, and coiled it loosely in his left hand, hangs a portion of the net over his left shoulder, and then gathering as much of the outer edge of the net as he can collect in his right hand, and holding it up so as to open the net as much as possible, makes a semicircular sweep of the body and the right hand—rather difficult to accomplish without practice—and whirls the net away off the shoulder. The centrifugal motion thus communicated to the leads, &c., on the bottom of the net, causes it to open like a circle on the surface of the water, the leads carry it to the bottom, and the net thus covers all that comes within its circle. The rope is then pulled gradually, and worked from side to side, in order to narrow the circle, to bring it once more into a cone; and, in their efforts to escape, the fish that may have been covered are gradually driven into the tuck or purse of the net. When the leads are all close together, the net is lifted from the water, and the fish in the tuck are taken out. The cost of a cast-net is regulated by the circumference and the size of the mesh. They may be had from 12*s.* to 30*s.* or more.

CASTING-VOTE, the vote by which the chairman or president of a meeting is generally empowered to *cast* the balance on the one side or the other, where the other votes are equally divided. In the House of Commons, the Speaker does not vote at all unless this occurrence takes place. As his position in this respect is felt to be a delicate one for a person whose duty it is to withdraw himself from the contentions of party, it is usual for the Speaker to vote in such a way as to give the House an opportunity of reconsidering its decision. The same rule prevails in select committees. Following a similar rule, the chairman at corporation and general meetings usually gives his casting-vote either in a way that will lead to a reconsideration of the subject, or for what seems the popular view of the case, although that may be at variance with his convictions.

CASTLE (Sax. *castel;* Lat. *castellum*, dimin. from *castrum*), a building constructed for the purpose of repelling attack. The root of the word is the same as that of *casa*, a little house or hut, and probably means a driving off, or repelling; and it is worthy of notice, in confirmation of this view, that in Welsh the radical syllable *cas*, signifies a C., separated, and also hatred, malice, &c. The *castella*, left by the Romans in Britain and elsewhere, were constructed on the general model of their stationary encampments (*castra stativa*), (see CAMP and ENCAMPMENT); and though they may have suggested the castles of the middle ages, they differed from them in being designed for military purposes only, and not also as places of permanent residence. Even Burgh Castle, in Suffolk, the ancient Garamonium, and Richborough Castle, in Kent, the ancient Rutupiæ, were encampments or fortresses, rather than castles.

Besides these monuments of the military occupation of the island by the Romans, traces are found in various parts of the country of encampments or castles, which are ascribed to its aboriginal or early inhabitants. These are generally situated on the tops of hills; as, for example, the Herefordshire Beacon, on the Malvern Hills; Moel Arthur, in Flintshire; Chem Castle, in Cornwall; the Maiden Castle, in Dorsetshire; the Caterthuns, near Brechin, in Forfarshire; the Barmkin of Echt, in Aberdeenshire. It is probable that the Saxons adapted the Roman castles to a certain extent to their modes of defence, and traces of Saxon, and even of Norman workmanship are found in structures which are

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believed to have been originally Roman. One very frequent change consisted in raising a mound of earth on one side of the walls on which the keep or citadel was erected. The Decuman and Prætorian gates were also, as at Portchester, converted into the fortified entrances peculiar to the castellated structures of the middle ages. But of castles designed for residence as well as defence, there are few or none which are of higher antiquity than the Conquest. They were part of the organisation of the feudal system—castle-guard being one of the duties which the tenants were taken bound to pay in return for their lands; and till that system was developed by the Normans, the residences of persons of importance were probably guarded only by their domestic retainers, or, in extraordinary circumstances, perhaps by the national militia. The absence of strongholds is said to have been a reason why William the Conqueror so easily became master of the kingdom; and it was as a protection against the resentment which the Conquest occasioned, that most of the great Norman castles of England were built. As these castles grew in strength by the additions and improvements of each generation, they afforded their possessors the means not only of security from their fellow-subjects, but of independence as regarded the central government. The lord of every C. became a petty tyrant; and no small portion of the histor of England, and, indeed, of Europe altogether, during the feudal period, consists of an account of the attempts which were made by the monarch to extirpate what Matthew Paris has emphatically designated as "these nests of devils and dens of thieves." Of castles of this description, it is said that in England, in the reign of Stephen (1135—1154), no fewer than 1115 were built.

The Norman C., which was the most complete structure of the kind, was generally surrounded by a moat or ditch; and in order that the ditch might be readily filled with water, the site chosen was usually either on the banks of a river, or on a peninsula running into a lake. In the latter case, the ditch was of course merely a deep cut made through the neck of land, by means of which the C. and its surroundings were converted into an island. On the inner side of the ditch mounds were constructed, which were surmounted with walls and towers, both of which, but particularly the latter, were supplied with battlements and bastions. The entrance gates were also protected by towers, which were usually of great strength. The communication was by a bridge, sometimes of stone, but usually of wood, which was made to draw up and down; and the entrance, in addition to thick folding doors, was protected by a Portcullis (q. v.), which was dropped down through grooves in the masonry at the sides. The gateway, in castles of the larger sort, was further defended by a Barbican (q. v.). On passing the external wall you entered the Bailey (q. v.), which sometimes consisted of several courts, and contained the barracks, magazines, well, a chapel, and sometimes even a monastery. The only portion of the C. which was always spoken of as distinguished from the bailey, was the Keep (q. v.) or citadel, which corresponded to the prætorium of the Roman fortification. The keep was a species of internal C., more strongly defended than any other portion of the fortress, and placed in the most advantageous position, so as to afford a last chance to the garrison when driven from the external works. As the keep had the same design as the C. itself, it contained most of its appliances, even to a chapel, when large and complete. The keep was also called the Dungeon or Donjon (q. v.). An excellent example of a keep is seen at Rochester Castle. The best known is probably that at Windsor, which forms so prominent an object in the surrounding landscape. The protection which the walls of his C. afforded to the retainers of a baron, in a state of society in which life and property were extremely insecure, naturally led to the construction of houses around the moat, and to this custom a very large number of the towns, both in England and on the continent of Europe, owe their origin. Along the banks of the Rhine, this process of town-formation may be seen in all its earlier stages; from the few peasants' houses and the village church nestling under the ivy-covered ruin on the cliff, to the large and prosperous city of Coblenz. Strange as it may seem, the existence of these castles may be regarded not only as a cause, but as an effect of a certain feeling of security on the part of the surrounding population; for where a country was thoroughly insecure, the risk of the castles falling into the hands of the enemy, and thus proving a source not of protection but of oppression, was so great as to prevent their erection. It is on this ground that Sir

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Walter Scott explains the slight character of the fortresses on the Scottish border, notwithstanding centuries of warfare. "It was early discovered that the English surpassed their neighbors in the arts of assaulting and defending fortified places. The policy of the Scotch, therefore, deterred them from erecting upon the borders buildings of such extent and strength, as being once taken by the foe, would have been capable of receiving a permanent garrison. To themselves, the woods and hills of their country were pointed out by the great Bruce as their safest bulwarks; and the maxim of the Douglases, that it was better to hear the lark sing, than the mouse cheep, was adopted by every border chief. For these reasons, we do not find, on the Scotish borders, the splendid and extensive castles which graced and defended the opposite frontier. The Gothic grandeur of Alnwick, of Raby, and of Naworth, marks the wealthier and more secure state of the English nobles." The residence of the Scottish chieftain "was commonly a large square battlemented tower, called a "*keep* or *peel*," placed on a precipice, or on the banks of a torrent, and, if the ground would permit, surrounded by a moat. In short, the situation of a border-house, encompassed by woods, and rendered almost inaccessible by torrents, by rocks and morasses, sufficiently indicated the pursuits and apprehensions of its inhabitants."—"Minstrelsy of the Scottish Border," Introduction.

CASTLEBA'R, the capital of the county of Mayo, Ireland, 159 miles west-north-west of Dublin. It is situated on the Castlebar river, near the head of a valley at the north-west end of the great limestone plain which includes the greater part of the counties of Roscommon, Sligo, Galway, and Mayo. The two main streets cross each other, and the chief buildings are in a square near the west end. The suburbs, as in most of the west Irish towns, consist of the wretched hovels of agricultural laborers. Pop. (1871) 3571. C. has some coarse linen manufactures. Here the Irish, in the rebellion of 1641, massacred the English parliamentary army, and in 1786 was executed the famous "fighting Fitzgerald." In 1798, the French general, Humbert, held the town for a fortnight. In 1846 and 1847, C. suffered extremely from the famine.

CASTLEREA'GH, Lord. See LONDONDERRY, MARQUIS OF.

CASTLES, in Heraldry, are often given as charges in the shields of persons who have reduced them, or been the first to mount their walls in an assault. The practice of heralds, in this as in other respects, has not been very consistent, as we learn that in 1609, a castle was granted by William Cambden, Clarencieux King of Arms, to William Frear, doctor of physic!

CA'STLETOWN, the capital town and seat of government of the Isle of Man, called in Manx *Balley Cashtal*, or the Town of the Castle. C. is situated on the margin of Castletown Bay, near the southern extremity of the island, and surrounds Castle Rushen, a Danish fortress of prodigious strength, having walls from 12 to 18 feet in thickness, built of the limestone found on the spot, which is of so imperishable a nature that the sharp angles of the keep retain the marks of the builder's chisel, though completed in the 10th century. The castle was founded by Guthred II. of the Orrys kings of Man, and having been added to from time to time, it now consists of a pile of building of a most imposing appearance. It underwent a six months' siege by Robert Bruce in 1313. The keep is used as the public jail of the island, and the other portion of the castle consists of public offices, officers' apartments, and accommodation for the chancery and other superior courts.

Being in the neighborhood of the bold coast-scenery of the Calf of Man, Spanish Head, &c., C. is a desirable resort for the numerous tourists who frequent the Isle of Man. Ship-building has of late made considerable progress in Castletown. Population in 1871, 2320.

CA'STOR and Po'llux, the two principal stars in the constellation Gemini (q. v.), were so called from Castor and Pollux, sons of Leda and Tyndareus, king of Lacedæmon. Their sister was the famous Helen of Troy. On account of their mutual attachment, Zeus placed them among the stars.

CASTOR and Pollux, the name given to a meteor, seen at sea, and which, under the form of twin balls of fire, attaches itself to the masts of ships. Sailors predict fair weather from its appearance. Sometimes, however, only one ball of fire is seen; the meteor is then called Helena, and it is regarded as foreboding a storm.

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Shakspeare makes mention of this superstition in the "Tempest" (Act 1 Scene 2).

CASTOR OIL, a fixed oil obtained from the seeds of the C. O. plant. In extracting the oil, the seeds are first bruised between heavy rollers, and then pressed in hempen bags under a hydraulic or screw press. The best variety of oil is thus obtained by pressure in the cold, and is known as *cold-drawn* C. O.; but if the bruised and pressed seeds be afterwards steamed, or heated, and again pressed, a second quality of oil is obtained, which is apt to become partially solid or frozen in cold weather. In either case the crude oil is heated with water to 212°, which coagulates, and separates the albumen and other impurities. Exposure to the sun's light bleaches the oil, and this process is resorted to on the large scale. When pure and cold drawn, C. O. is of a light-yellow color; but when of inferior quality, it has a greenish, and occasionally a brownish tinge. It is somewhat thick and viscid. Its specific gravity is high for an oil, being about 960 (water being taken as 1000). It is miscible with alcohol or spirits of wine and ether. Reduced to a temperature of 0° F., it does not become solid; but exposed to the air it very slowly becomes rancid, then dry and hard, and serves as a connecting link between the drying and non-drying oils. It has a nauseous smell, and an acrid, disagreeable, and sickening taste, which may be overcome by the addition of a little magnesia. The principal acid present in it is *ricinolic* acid ($HO,C_{36}H_{33}O_5$), which is allied to oleic acid.

C. O. is one of the most convenient and mildest of purgative medicines. Given in doses of one or two tea-spoonfuls, with a little peppermint-water, it forms a gentle laxative for habits easily acted on by medicine; while a dose of a table-spoonful, or a little more, will almost always succeed if it remains on the stomach. The only serious objection to the use of C. O., are its disagreeable flavor, and the sickness often produced by it; some persons get over this difficulty by floating the oil in hot coffee, which is said to remove its nauseous quality.

The adulterations of C. O. may be various. Several of the fixed oils, including lard, may be employed. The best test of its purity is its complete solubility in its own volume of absolute alcohol, which other fixed oils are not. Croton oil is occasionally added, to increase the purgative powers of the oil.

The CASTOR-OIL PLANT (*Ricinus communis*) is a native of the south of Asia, but now naturalised in the south of Europe, and in other warm regions of the globe. The genus *Ricinus* belongs to the natural order *Euphorbiaceæ*. It has panicled flowers, with 3—5 partite perianth; the fruit a tricoccous capsule, with one seed in each cell, the outside of the capsule generally covered with soft spines. The castor-oil plant is often cultivated in gardens in the middle, and even in the northern parts of Europe, where it is only an annual, attaining a height of 3—10 feet, but highly ornamented by its stately growth, its large, broad, palmato-peltate, 7—9-fid leaves, ¾—2 feet in diameter, and its generally purplish hue. Its flowers are produced in long glaucous racemes. In warmer climates, it is perennial, and its stem becomes arborescent, attaining even 30 feet in height, with a corresponding thickness, so that ladders are used for climbing it. Different species which have been described, are probably mere varieties. It was known to the ancients, and appears to have been valued by them. Its seeds have been found in Egyptian sarcophagi. From the resemblance of its seeds to an insect called *ricinus*, it received that name from the Romans. The seeds are oval, and about four lines long. They are chiefly valued for the oil which they yield, on account of which the plant is cultivated in the Levant, Spain, Provence, the West Indies, Brazil, the United States of America, as far north as New Jersey, and in other tropical and warm temperate countries.—Although castor oil is chiefly used in medicine, it is not unfit for lamps and for oiling the wheels of machinery. The streets of Lima are lighted, and the machines used in the works of the sugar-plantations of Peru are oiled with it. The appearance of the castor-oil plant obtained for it the name of *Palma Christi*, by which it is still sometimes called. Its seeds were formerly known as *semina cataputiæ majoris*.

CASTO'REUM, a substance secreted in two glandular sacs, closely connected with, but quite distinct from, the organs of reproduction in the Beaver (q. v.), and at one time held in the highest repute in medicine, although now regarded as almost inert, and chiefly used by perfumers. The C. sacs are pear-shaped, and it appears in commerce in these sacs themselves, connected in pairs as they are taken from

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the aminal. C. is produced both by the male and by the female beaver. In Hudson's Bay commerce, ten pair of them are equal in value to one beaver skin. Russian C. is of much higher value than American. C. was well known to the ancients. From the time of Hippocrates, it was regarded as having a specific influence over the uterus, and is still in use in the north of Europe. It was at one time also esteemed a most valuable medicine in hysteria, catalepsy, and other spasmodic diseases.

CASTO'RIDÆ, a family of *Mammalia*, of the order *Rodentia*, of which the Beaver (*Castor*) is the type, and in which besides the beaver, the Coypu (*Myopotamus*,) and the *Musquash*, some naturalists include other genera more commonly regarded as belonging to the Mouse and Rat family (*Muridæ*), as the Lemmings and Voles.

CASTRAMETA'TION is the art of encamping; and a *camp* is the result of that art. See CAMP, ENCAMPMENT.

CASTREN, Matthias Alexander, the greatest authority in regard to the Finnish people and language, was born in 1818, not far from the Lappish boundaries of Finland. He received his earliest instruction in the town of Tornea, and afterwards studied at Helsingfors. About the year 1838, he undertook a pedestrian excursion through Finnish Lapland, in order to extend his knowledge of the language and literature: and in 1840, another through Carelia, to collect ballads, legends, &c., illustrative of Finnish mythology. On his return, he published a Swedish translation of the famous Finnish poem, "Kalevala," the metre and style of which have been imitated by Longfellow in his poem of "Hiawatha." Aided by the government of his native province, he commenced his researches among the Finnish, Norwegian, and Russian Laplanders, as also among the European and Siberian Samoyeds. Appointed linguist and ethnographer to the St Petersburgh Academy, C., between the years 1845 and 1849, prosecuted his laborious investigations as far east as China, and as far north as the Arctic Ocean. On his return, he was appointed first professor of the Finnish language and literature at the university of Helsingfors. He employed himself in preparing for publication the vast materials which he had collected, but died 7th May 1852, from exhaustion—a martyr to science. Before his death, appeared "Versuch einer ostjäkischen Sprachlehre nebst kurzen Wörterverzeichniss" (Petersburg, 1849), as the first instalment of his "Northern Travels and Researches." He also wrote "Elementa Grammaticæ Syrjænæ" (Helsingfors, 1844), and "Elementa Grammaticæ Tscheremissæ" (1845); "On the Influence of the Accent in the Lappish Language" (Petersburgh, 1845); "De Affixis Personalibus Linguarum Altaicarum" (Helsingfors, 1850), &c.

CASTRES, a town of France, in the department of Tarn, is situated on both sides of the river Agout, 46 miles east of Toulouse. The two parts of the town are united by two stone bridges. In the middle ages, C. was celebrated for its Benedictine abbey, the heads of which exercised a temporal sway over the place. Later, it was one of the strongholds of the reformed party, but it was forced to submit, and had its fortifications demolished in the reign of Louis XIII. C. has beautiful promenades, shaded by fine alleys of trees, and in the neighborhood is a remarkable rocking-stone, 11 feet high, and weighing some 80 tons. It is of egg-shape, and rests upon its smaller end; a strong push is sufficient to cause its vibration. C. is a busy manufacturing place. Its fine wool-dyed goods are especially famous, and it has also manufactures of linen, leather, paper, soap, &c. Pop. (1872) 16,458.

CA'STRI, or Kastri, a village of modern Greece, in the government of Phocis, situated on the south declivity of Mount Parnassus, and worthy of notice, as occupying a portion of the site of the ancient Delphi (q. v.). The famous Castalian spring, now called the Fountain of St John, is situated between 900 and 800 yards to the east of the village. Beside t grows a plane-tree, the only one in C., which is fabled to be that planted by Agamemnon.

CA'STRO (ancient *Mitylene*), a seaport town of Asiatic Turkey, capital of the island of Mitylene, situated on the east coast, about 55 miles north-west of Smyrna. It is surrounded with walls, and defended by a castle, and its streets are narrow and dirty. Remains of the ancient town are found to the west. Pop. 6500.

CASTRO, Ines de, whose mournful fate is the subject of several tragedies and

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poems, was the daughter of Pedro Fernandez de Castro, and sprang from a branch of the royal family of Castile. She was appointed lady-in-waiting to the wife of Dom Pedro, son of Alfonso IV. of Portugal. Her beauty captivated Dom Pedro, and, after the death of his wife, in 1345, he secretly married Ines. Their stolen interviews took place in the convent of St Clara, at Coimbra, until the secret was discovered and revealed to the king, who was made to believe that this union might prove injurious to the young Ferdinand, son of Dom Pedro by his deceased wife. Questioned by his father, Dom Pedro had not the courage to reveal the whole truth, while he refused to marry another. In the king's council, it was determined that Ines must die. To see this sentence executed, the king hastened to Coimbra, while his son, Dom Pedro, was engaged in hunting (1355); but the sight of the beautiful Ines, who, with her children, cast herself at the feet of the king, and prayed for mercy, diverted him for a few moments from his purpose. His advisers, however, soon obtained from the king permission to execute the sentence, and, in the course of an hour after the interview, Ines fell, pierced by the daggers of assassins. Dom Pedro attempted a revolt against his father, but was pacified by the queen and the Archbishop of Braga, and promised not to seek revenge for the death of Ines. Two years afterwards, the king died, having shortly before his death recommended the murderers of Ines to leave Portugal, and seek shelter in Castile, where Peter the Cruel was then ruling. As several of Peter's nobles had escaped into Portugal, to avoid his oppression, he now proposed to Dom Pedro an exchange of fugitives, to which the latter (now king of Portugal) consented. Two of the assassins accordingly were delivered up, and were tortured and burned. Two years afterwards, the king, in an assembly of the nobility, declared that he had been lawfully married, by papal sanction, and in the presence of the Archbishop of Guarda, to Ines de Castro. When this statement had been confirmed by several testimonies, the king gave orders that the corpse of Ines should be removed from its grave, clothed in royal attire, with a crown on the head, and seated on the throne, should receive homage as a queen. This strange ceremony was performed, the nobles of Portugal bowing before the enthroned dead, and kissing the hem of the royal robe. The body was then removed to Alcobaça, followed by the king, with the bishops and the nobility, all on foot. A splendid marble monument was erected over the grave of Ines, surmounted by her statue, wearing a crown.

CA'STRO DEL RI'O, a town of Andalusia, Spain, situated on a slope on the right bank of the Guadajocillo, 16 miles south-east of Cordova. A portion of the old town is surrounded by ruinous walls; the new town lying outside of these has some good streets. It has manufactures of woollen and linen fabrics, earthenware, &c., and considerable trade in agriculture. Pop. 9100.

CA'STRO-GIOVA'NNI, a town of Sicily, in the province of Caltanisetta, is situated 13 miles n.-e. of the chief town of the province, on a remarkable fertile plateau, which rises precipitously to a height of 4000 feet above the sea-level. C. occupies the site of the ancient *Enna*, of which Ceres was the presiding goddess, and her most famous temple was here. The neighborhood was the scene of Proserpine's abduction by Pluto. In connection with the Punic and Servile wars, Enna has a conspicuous part in early history. There are no remains of the old town. A castle and other buildings of Saracenic origin are still standing. The district yields large quantities of sulphur. Pop. 14,633.

CASTRONUO'VO, a town of Sicily, in the province of Palermo, 25 miles north of Girgenti. It is situated on a hill, is fortified, and in its vicinity are quarries of fine marble. Pop. 4029.

CASTROVILLA'RI, a town of South Italy, in the province of Cosenza, 34 miles north of Cosenza. It is situated on an eminence surrounded by mountains, is partially fortified, and has an old massive castle, and a trade in wine, manna, silk, &c. Pop. 7931.

CASTUE'RA, a town of Estremadura, Spain, 68 miles east-south-east of Badajos. It is situated near the right bank of the Guadalefra, has several good streets, manufactures of brick, earthenware, &c., and a trade in agricultural produce; there is also some weaving carried on. Pop. 5600.

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CA'SUAL POOR are persons temporarily relieved without being admitted to the roll of permanent paupers. See POOR-LAWS.

CA'SUALTIES OF SUPERIORITY, in the feudal law of Scotland, are such emoluments arising to the superior as depend on uncertain events. See WARDHOLDING.

CASUARI'NA, a genus of trees of the natural order *Amentaceæ*, and of the suborder *Casuarineæ*, which is regarded by some as a distinct natural order. The trees of this genus are almost exclusively Australian; one only *C. equisetifolia*, being found in the South Sea Islands, the Indian Archipelago, the Malayan peninsula, and on the east side of the Bay of Bengal, as far north as Arracan. Some of them are large trees, producing timber of excellent quality, hard and heavy, the *Beef-wood* of the Australian colonists, so called from the resemblance in color to raw beef. *C equisetifolia* is called in Australia the SWAMP OAK. It is a lofty tree, the *Toa* or *Aitoa* of the Society Islands, where it grows chi fly on the sides of hills, and where its wood was formerly used for clubs and other implements of war. It has been introduced into India, and is there much valued, as its wood bears a great strain, and is not readily injured by submersion in water. The hardness and durability of this wood led the earlier voyagers to the South Sea Islands to designate it *Iron Wood*. *C. quadrivalvis* is the SHE OAK of New South Wales. CASSOWARY TREE is a popular generic name of the *Casuarinæ*. Some of the species are scrubby bushes. All of them have a peculiar appearance, their branches being long, slender, wiry, drooping, green, jointed, with very small scale-like sheaths instead of leaves. They resemble aborescent *Equisetaceæ*. The fruit consists of hardened bracts, collected in a *strobilus*, or cone, and enclosing small winged nuts. The flowers have neither calyx nor corolla; the stamens and pistils are in separate flowers, the male flowers with only one stamen the female flowers with a one-celled ovary, the male flowers in spikes, the female flowers in dense heads. More than 20 species are known.

CA'SUISTRY, called by Kant the *dialectics of conscience*, is that branch of theology and morals which professes to deal with very delicate moral questions—*casus conscientiæ*—and which supplies rules and principles of reasoning for resolving the same; drawn partly from natural reason and equity, and partly from the authority of Scripture, the canon law, councils, fathers, &c. C. has been, and still is, studied chiefly by Roman Catholic theologians; but at one period Protestant divines also paid some attention to the perilous science. The rudiments of it, however, are to be sought for in antiquity. Traces of it are found in the Stoic philosophers of ancient Greece. This is not to be wondered at, for C. is not, in its essence, a device of the schoolmen, although the latter elaborated it into a science, but a natural expression of the intellect and moral nature of man, when he is placed in circumstances of great perplexity. The sound and healthy reason of antiquity, however, could not enter into the morbid refinement, or rather the insidious corruption of morals found in certain Jewish and Christian writers. The "Talmud" (q. v.) contains an enormous accumulation of casuistical questions, while the sphere of Christian ethics in the middle ages often became a mere arena for unprofitable and pernicious disputations of this nature, as is seen in such works as the "Summa Raymundiana," "Summa Astesana," "Summa Bartholina," which obtained their names from their respective compilers. At a later period, the Jesuits Molina, Escobar, Sanchez, Busenaum, &c., became notorious for their abuse of ingenuity in the construction of moral puzzles, and for the flagrant immorality of their solutions. Some of them still "suffer the vengeance" of Pascal's immortal satire. It is nevertheless indubitable, that in the life of every man—now as formerly—*casus conscientiæ* will at times arise, when the higher laws of morality come into collision with subordinate conventional ones. The dubiety as to what the path of duty is, what *ought* to be done, resulting from this collision, naturally and legitimately leads to many nice considerations. If these are carried on under the guidance of a pure conscience, no harm can ensue, but, on the contrary, much good. Such however, is not the *perverted* C. of the Jesuits, "the art of quibbling with God," as M. Le Feore, preceptor to Louis XIII., called it, in which a man seeks to justify, by subtle quirks, his immoral actions. Mayer has published an account of all the writers on cases of conscience, ranging them under three heads—Lutheran, Calvinistic, and Romish.

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CA'SUS BE'LLI, or a case of war, is the reason alleged by one power for going to war with another. It is found impossible to reduce these causes or reasons to any definite code, because an ambitious or aggressive power has no difficulty in *making* a reason to declare to others, without acknowledging the real reason.

CAT (Lat. *catus*), a name sometimes extended to the whole family of quadrupeds designated by zoologists *Felidæ* (q. v.), the genus *Felis* of Linnæus; and sometimes more restrictedly applied to a section of that family, containing a number of its smallest species, the domestic cat and species most nearly allied to it. These form the subject of the present article. They all pursue their prey on the branches of trees more than on the ground, and are most expert climbers, in which, however, they are rivalled by some of the other *Felidæ*.

The origin of the domestic C. is by no means well ascertained; and by some naturalists it is described as a distinct species, under the name *Felis domestica*, which perhaps may be regarded as at least a convenient provisional designation, until satisfactory reasons can be adduced for referring it to some species existing in a wild state. By many, indeed, the domestic C. has been confidently pronounced to be a mere domesticated variety of the common Wild C. (*Felis Catus*) of Europe and the north of Asia; but to this there are many objections; the most important being that it is always of smaller size, contrary to what is usually observed of the effects of domestication in animals; and that in cats of the domesticated race which have run wild, and in their known progeny, there is no appearance whatever of a tendency to return to the type of the true wild cat.—Another opinion as to the origin of the domestic C. has obtained the assent of a considerable number of naturalists; that it is derived from the *Felis maniculata*, or Gloved C. of North Africa, a species discovered by the celebrated traveller Rüppell. But Mr Owen has stated a perfectly conclusive reason against identifying the domestic C. with the *Felis maniculata*, that the first deciduous molar tooth in the latter has a relatively thicker crown, and is supported by three roots, whilst the corresponding tooth both of the domestic C. and of the wild C. of Europe has a thinner crown, and only two roots.

The certainty, however, that the C. existed as a domestic animal in ancient Egypt, makes it not improbable that we ought to look for its original on the banks of the Nile, or in some of the countries from which the ancient Egyptians might most readily have obtained it. Of its rarity in Britain in former times, when the wild C. was common in all the woods which covered so much of the island, a curious evidence is afforded by a Welsh law quoted by Pennant—a law of the reign of Howel the Good, who died in 938 A. D.—fixing the prices of cats according to their age and qualities, beginning with a price for a kitten before it could see, and enacting that if any one stole or killed the C. that guarded the prince's granary, he was to forfeit a milk ewe, its fleece and lamb; or as much wheat as when poured on the C. suspended by its tail, the head touching the floor, would form a heap high enough to cover the tip of the tail.

It is needless to describe an animal so well known as the domestic C., or to do more than allude to its purring, its mewing, and the other sounds which it makes, its aversion to wet its feet or fur, its love of heat and comfort, its stealthy manners when in quest of prey, its patient watchfulness, so often fatal to mice, and other points of its natural history with which everybody is familiar.

The delight which a C. takes in tormenting a mouse before killing it, has sometimes been mentioned as an apparent exception to the general character of goodness manifest in the instincts of animals. It is an interesting circumstance, however, that when the prey is a bird instead of a mouse, a C. immediately inflicts a mortal wound, as if aware of its greater power of effecting its escape.

The eye of the C. is capable of much contraction and dilatation of its pupil, so that the animal can see in a very feeble light, and is thus adapted for those nocturnal habits to which, even in domestication, it shews so strong a natural tendency.

The fur of the C. is very free from any oily substance, so as to be readily injured by water, and is capable of being rendered highly electric by friction, particularly in very dry or frosty weather. An electric spark is readily obtained from the tip of the ear.

The strong statements of Buffon gave for a time great currency to the opinion, that the C. is incapable of affection, and retains, even in a domesticated state, its savage ferocity, merely restrained by selfishness, and disguised by cunning. The

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belief is very prevalent that the C. forms an attachment to places only, and not to persons. There are, however, well-authenticated stories which proves the C. to be capable of strong attachment to its master or mistress, although this quality is less frequently and remarkably displayed than by the dog. The instances which have, on the other hand, been recorded to shew the attachment of the C. to places, are well worthy of attention in connection with the subject of instinct in animals. Some of these instances of cats finding their way back from great distances to their former home, are very wonderful, and indeed cannot be explained on any grounds or principles known. The same instinct and power, however, are displayed by other animals.

The varieties of the domestic C. are neither numerous nor very different. The *Tortoise-shell C.* differs from the most common variety chiefly in color, although it is also particularly elegant and delicate in form. It is much more common in the south of Europe than in Britain.—The *Angora C.* is a beautiful variety, remarkable for its long silky hair.—The *Chinese C.* has a fine glossy fur, and is remarkable for its pendulous ears.—The *Chartreuse* is of a bluish color.—It is supposed that the *Tabby* may have undergone less change by domestication than any other variety.

The wild C. is still to be found in a few of the woods of the north of England, in the mountains of Wales, the Highlands of Scotland, and some parts of Ireland. It has entirely disappeared from districts where it was once common. It is the only beast of prey remaining in Britain the strength and fierceness of which make it at all dangerous to man; but an encounter with a wild C. is safe only to a man well armed. Fortunately, the instances of its attacking when unmolested are rare, but such instances have occurred. The wild C. is an inhabitant of deep thickets and recesses of woods, and of the rocky and bushy ravines of mountainous districts. Its fur is held in considerable estimation. The fur is soft, long, and thick. The color of the face is yellowish-gray, with a band of black spots towards the muzzle; the forehead is brown; the head is gray, with two black stripes passing from the eyes, over and behind the ears; the back, sides, and limbs are gray, darker on the back, paler on the sides, with a blackish longitudinal stripe along the middle of the back, and numerous paler curved ones on the sides; the tail is ringed with light-gray and black, the tip being black. The length of a medium-sized male wild C. is almost 2 feet, exclusive of the tail, but this length is sometimes very considerably exceeded.—We know no record of any attempt to domesticate the wild cat.

The animal often called wild C. in America, is the Bay Lynx. See Lynx.

Superstitions Regarding Cats.—Cats have been objects of superstition from the earliest ages. In Egypt they were held in the highest reverence; temples were erected in their honor; sacrifices and devotions were offered up to them; and it was customary for the family in whose house a C. died, to shave their eyebrows. In the middle ages they were regarded as the familiars of witches. The favorite shape of Satan was said to be that of a black C., and the animal was an object of dread instead of veneration. There is or was a belief among sailors, that the frolics of a C. at sea portended a storm. Many people still prophesy rainy weather from a C. washing its face, and a cat-call on the house-top was formerly held to signify death. Their supposititious connection with witches, and the foolish belief that a C. has nine lives, have led to the perpetration of great cruelties upon this harmless and very useful domestic animal. See Brand's "Popular Antiquities," Ellis's revised edition.

CAT, on shipboard, is a name for many of the ropes or lines employed. A *cat-fall* is a rope for heaving up the anchor from the water's level to the bow; it works through *cat-blocks*, and is connected with the *cat-head*. *Cat-harpings* are small ropes for tightening the shrouds. The *cat-heads*, just named, are two strong short timbers projecting from the bow, on each side of the bowsprit. A *cat-hook* fastens the ring of the anchor to the cat-block.

CAT, or Cat-castle, in the military engineering of the middle ages, was a kind of movable tower to cover the sappers as they advanced to a besieged place. The garrison sometimes poured down burning pitch and boiling oil from the walls upon the C.; but occasionally this stratagem proved disastrous, for the besiegers availed themselves of the blazing tower to burn the wooden gates of the town or fortress.

CAT-O'-NINE-TAILS. See Flogging.

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CATABRO'SA (Gr. *catabrōsis*, a gnawing), a genus of grasses formerly included in *Aira* (see HAIR-GRASS), but distinguished by the leathery *palea*, which are ribbed, truncated, erose (as if gnawed at the points), awnless, and nearly equal. The glumes are much shorter than the spikelets, membranaceous, and very obtuse. The general appearance is different from that of the genus *Aira*.—*C. aquatica* is a pretty common British grass. It is of very wide geographic and climatic range, being found throughout Europe, from Lapland to the Mediterranean, and also in the torrid regions of South America. It grows only in very moist situations, as the muddy margins of lakes and rivers, ditches, &c., and is only cultivated in irrigated meadows, or on the banks of rivers subject to be overflowed by high tides, where the ground is always wet and muddy. It is one of the most valuable grasses for such situations, its foliage being peculiarly sweet, and much relished by cattle. Both its foliage and its seeds, also, afford much food to water-fowl, and to some kinds of fish, particularly carp. Its leaves often float, and its stalks seldom rise, more than a foot or fifteen inches above the surface of the water. It has a stiff branching panicle, with whorled spreading branches, and its seeds are small. When its artificial propagation is attempted, it is more frequently by dropping freshly gathered stems into still waters, or scattering them on the mud, than by sowing the seeds. It is sometimes called WHORL GRASS, and sometimes SWEET WATER GRASS.

CA'TACOMBS (Gr. *kata*, and *kumbos*, a hollow), subterraneous chambers and passages formed generally in a rock, which is soft and easily excavated, such as *tufa*. C. are to be found in almost every country in which such rocks exist, and, in most cases, probably originated in mere quarries, which afterwards came to be used either as places of sepulture for the dead or as hiding-places for the living. The most celebrated C. in existence, and those which are generally understood when C. are spoken of, are those on the Via Appia, at a short distance from Rome. To these dreary crypts it is believed that the early Christians were in the habit of retiring, in order to celebrate their new worship, in times of persecution, and in them were buried many of the saints and martyrs of the primitive church. They consist of long narrow galleries, usually about 8 feet high and 5 wide, which twist and turn in all directions, very much resembling mines. The graves were constructed by hollowing out a portion of the rock, at the side of the gallery, large enough to contain the body. The entrance was then built up with stones, on which usually the letters D. M. (Deo Maximo), or XP., the first two letters of the Greek name of Christ were inscribed. Other inscriptions and marks, such as the cross, are also found. Though latterly devoted to purposes of Christian interment exclusively, it is believed that the C. were at one time used as burying-places by pagans also. At irregular intervals, these galleries expand into wide and lofty vaulted chambers, in which the service of the church was no doubt celebrated, and which still have the appearance of churches. The original extent of the C. is uncertain, the guides maintaining that they have a length of 20 miles, whereas about 6 only can now be ascertained to exist, and of these, many portions have either fallen in or become dangerous. When Rome was besieged by the Lombards in the 8th c., many of the C. were destroyed, and the popes afterwards caused the remains of many of the saints and martyrs to be removed and buried in the churches. Art found its way into the C. at an early period, and many remains of frescoes are still found in them. The C. at Naples, cut into the Capo di Monte, resemble those at Rome, and evidently were used for the same purposes, being in many parts literally covered with Christian symbols. In one of the large vaulted chambers there are paintings, which have retained a freshness which is wonderful, when the influences of time and the dampness of the situation are taken into account. The palm-tree, as a memorial of Judea, is a prominent object in these pictures. At Palermo and Syracuse there are similar C., the latter being of considerable extent. They are also found in Greece, in Asia Minor, in Syria, Persia, and Egypt. See NECROPOLIS. At Milo, one of the Cyclades, there is a hill which is honey-combed with a labyrinth of tombs running in every direction. In these, bassi-rilievi and figures in *terra cotta* have been found, which prove them to be long anterior to the Christian era. In Peru and other parts of South America, C. have been discovered. The C. in Paris are a species of charnel-houses, into

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which the contents of such burying-places as were found to be pestilential, and the bodies of some of the victims of 1792, were cast by a decree of the government.

CATAFA'LCO (Ital. a scaffold), or Catafalque, a temporary structure of carpentry, intended to represent a tomb or cenotaph, and adorned with sculpture and painting. It was employed in funeral ceremonies. The most magnificent C. ever made, perhaps, was that used at the interment of Michael Angelo, at Florence.

CATALA'NI, Angelica, a highly celebrated Italian singer, born at Sinigaglia, in Central Italy, some say in 1780, others in 1784, educated in the convent of St Lucien, near Rome, where, in her seventh year, she displayed such wonderful vocal powers that strangers flocked from all quarters to hear her. She made her first public appearance at Venice, in her 16th year, and experienced a succession of triumphs in every country in Europe for more than 30 years, amassing immense sums of money. The Italian Opera in Paris was twice under her direction; but her husband's interference and extravagance brought her into much trouble. Her large queenly person and fine countenance, the immense volume, range, and flexibility of her voice, her power of sustaining her notes, in contrast with the lightness and facility of her unerring execution, everywhere took her audience by storm. Her expression, although fine, and her whole style, surprised rather than touched the heart. In concert-singing, her great triumphs were in Rhode's Air with variations, and *God Save the King*—which she would call *shave*; and in Oratorios, Luther's Hymn, her delivery of which, especially when her marvellous voice alternated with the trumpet's sound, was so sublimely awful, that the audience were hushed and pale, and some were borne away fainting. The throat from which these wondrous sounds proceeded was physically of such dimensions, that a physician, when called to look into it, declared he could have passed down a penny-loaf! In 1830, Madame C. purchased a villa near Florence, formerly belonging to the Medici family, where she gave free instructions to girls who had a talent for singing on condition of their taking the name of Catalani. In the spring of 1849, when political disturbances broke out in Tuscany, she repaired with her daughters to Paris, where she died of cholera on the 13th of June.

CATALAU'NIAN PLAIN (*Campi Catalaunici*), the ancient name of the wide plain surrounding Chalons-sur-Marne, in the old province of Champagne, France, celebrated as the field of battle where the West Goths, and the forces under the Roman general Aëtius, gained a great victory over Attila in 451 A.D. A wild tradition (made the subject of a striking picture by Kaulbach, "Die Hunnenschlacht, or the Battle of the Huns") tells that three days after the great fight, the ghosts of the fallen myriads appeared on the plain, and renewed the conflict.

CATA'LDO, San, a town of Sicily, in the province of Caltanisetta, and 5 miles west of the town of that name. There are productive sulphur mines in its vicinity. Pop. 12,800.

CA'TALEPSY (*katalepsis*, a taking possession of), a state of more or less complete insensibility, with absence of the power of voluntary motion, and statue-like fixedness of the body and limbs in the attitude immediately preceding the attack, a like position being also retained, unless altered by force, until the return of consciousness. Such is the abridged description of C., as commonly given in works of authority. The patient is usually in good health at the time of seizure, or subject only to nervous affections, such as hysteria (q. v.); sometimes the attack is preceded by disappointment, fear, violent exciting or depressing passions, or even religious emotions, being in such cases only an extreme form of what is otherwise called trance, reverie, or ecstasy (q. v.); on other occasions, the apparent cause is more purely physical, as in some of the hysterical cases, depending on suppressed menstruation. In all cases of cataleptic rigidity and insensibility, it may be presumed that the brain, as an organ of consciousness, is disturbed; but it does not appear that in any considerable proportion there is structural disease. Patients rarely die during the attack, which may, however, be protracted for an indefinite period, and may even endanger life indirectly by the debility consequent on imperfect nourishment. The circulation and respiration are, in most instances, little affected; cases, however, have been recorded in which, in consequence of their failure, the patient has been supposed to be dead. See DEATH, APPARENT. Many

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of the recorded cases of C. are little worthy of credit, and it has even been doubted whether this curious disease can ever be said to exist except as the result of some degree of deception, or at least voluntary and conscious regulation of the muscles on the part of the person affected. The combination of C. with hysteria, and its frequent association with what are called the higher phenomena of mesmerism (q. v.), are undoubtedly circumstances of great suspicion; but it would certainly be wrong to suppose that all the cases described were fictitious, and not less so to classify them all under the head of pure imposture. Epidemic C. has been described, and in such cases would appear plain that the principle of imitation, so powerful in producing nervous disease, must have been at work. The remedies of C. are the same as those of the states to which it is so nearly allied, and of which it may be said to form a part. Moral means form a large part of the treatment, as in hysteria. In some cases, it may become necessary to administer food by means of the stomach-pump, and this even for weeks or months. We have seen such a case end in complete recovery.

CATALOGUE (Gr. a list). See BIBLIOGRAPHY, BRITISH MUSEUM, LIBRARY, STARS.

CATALO'NIA (Spanish, *Cataluña*), an old province and principality of Spain, now divided into the provinces of Barcelona, Tarragona, Lerida, and Gerona, the total area being 12,180 miles, and the population (1870) 1,768,408. C. occupies the north-eastern corner of Spain, having France on the north, and the Mediterranean on the east and south-east. It is watered by the Llobregat and the Ter, and by some of the affluents of the Ebro, the last-mentioned river having its embouchure in Catalonia. The coast is rugged, its boldest promontories being Capes Creus and San Sebastian, and its deepest indentations the Bays of Rosas and Tarragona. With the exception of a few low plains of limited extent, the soil of C. is that of a wild mountainous region formed by numerous offsets or terraces of the Pyrenees, one great ridge or series of ridges extending through the centre of the province.

The terraces, sloping abruptly down to the coast, or to the narrow coast plains, are divided by the valley of Llobregat into the lower and the upper Catalonian mountains.

The climate of C., though fog and rain are frequent, and extreme and rapid changes of temperature prevail, is on the whole healthy and favorable to vegetation. Near Barcelona, oranges flourish in the open air; the fields in some parts are bounded by aloe-hedges; and olives grow on Montserrat. Cork-trees grow on the mountains, and thickets of thorn-apple, laurel, myrtle, pomegranate, box, rosemary, &c., extend where the cork has its limits. Northern upper C. has a more severe winter than the south; but everywhere, vineyards and olive-gardens cover the slopes, and cornfields extend in the valleys. Among the other products are hemp, flax, madder, barilla, and saffron. Hazel-nuts, a variety called Barcelona nuts, are extensively grown. Meadow-lands and pastures are comparatively rare, and horned cattle are, therefore, mostly confined to the districts bordering on the Pyrenees; while few horses and mules are kept; but sheep, goats, and swine are bred in considerable numbers. Silk-worms and bees are also reared. The coasts abound with fish, and game is plentiful. The minerals are coal, copper, manganese, zinc, lead, cobalt, salt, sulphur, and many varieties of marble.

C. is the principal manufacturing province of the kingdom—is, in fact, the "Lancashire of Spain." The inhabitants are neither French nor Spaniards, their language, costume, and habits being quite distinct from those of either; they have also local coins, weights, and measures. In energy, industry, and intelligence, they greatly surpass the rest of the Spaniards.

C., under the name of *Hispania Tarraconensis*, was one of the earliest, and remained among the last of the Roman Provinces. It was invaded and captured by the Alans, who were followed by the Goths, hence its name, *Gothalania*, changed into Gothalunia or Catalonia. In the 8th c., the Arabs gained possession of the southern part. When Charlemagne, in 788, subjugated Spain as far as the Ebro, C. formed the central portion of the Spanish mark, governed by French counts, having Barcelona as their residence. They soon made themselves independent of France. In 1137, Earl Raymund Berengar, by his marriage, united C. with Aragon; and the marriage of Ferdinand and Isabella (1469) united both with Castile, and so

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C. became a portion of the Spanish monarchy, but never a very peaceable one. In modern times it has repeatedly taken a prominent share in Carlist or other insurrections.

CATA'LYSIS (Gr. dissolution) is a term applied in Chemical Physics to a force supposed to be exerted by one substance upon a second, whereby the latter is subjected to change or decomposition, whilst the former, or acting substance, remains comparatively unaltered, and does not combine with it. The force, indeed, has been ascribed to the mere "action of contact." Fermentation is an example of this force (see BEER), when one part of yeast acting upon the sugar of the sweet worts, without entering into combination with it, compels 100 parts of sugar to pass into alcohol and carbonic acid. Germination, or the sprouting of grain when placed in the ground, is another example where one part of *diastase* changes 1000 parts of starch into sugar. No plausible theory has brought forward to account for these changes, or to define what the force of C. is. Liebig has suggested, as an explanation, "that a body in the act of combination or decomposition enables another body with which it is in contact to enter into the same state;" but this view does not explain C., as that force does not act in the majority of cases where changes are proceeding, and, moreover, the acting substance, while changing itself, never throws the body acted upon into the *same state of change*, but causes it to assume a new series of changes different from those pursued by itself.

CATALYSOTYPE, a name given by its inventor, Dr Wood, to a modification of the calotype process upon the assumption that light set up a catalytic action (see CATALYSIS) among the ingredients employed. The paper is first washed with very dilute hydrochloric acid, to prevent the formation of yellow patches of insensitiveness, and then treated with syrup of iodide of iron containing a trace of free iodine: it is then partially dried between folds of blotting-paper, and sensitized by brushing over it a solution of nitrate of silver of ten grains to the ounce. Immediate exposure in the camera follows; after which, though no picture be visible at first, if it be allowed to remain in the dark for a period which varies with the length of time it was exposed, and the amount of light, a negative picture of great perfection is gradually developed. It is not necessary, however, for the explanation of this phenomenon, to assume that a catalytic action is set up, inasmuch as the ordinary chemical reactions are quite sufficient to account for it. As soon as *nitrate of silver* comes in contact with the moist *iodide of iron* with which the paper is first imbued, an interchange of elements takes place, *iodide of silver* is precipitated in the pores of the paper, and *protonitrate of iron* is diffused over the surface; and this latter salt is even a more energetic developing agent than the ordinary gallic acid, hence the seemingly spontaneous appearance of the picture. This process is so uncertain in its results, that it is seldom practised.

CATAMARA'N is a raft formed of three planks lashed together, the middle one serving as a keel, and the other two for the sides. The rower stands or kneels on the middle plank, and works a paddle. These simple vessels are used by the natives of Madras, to maintain communication between ships and the shore, ordinary boats being rendered unsafe by the surf. By the adoption of a similar construction on a larger scale, some of the catamarans are made large and strong enough to carry goods, and even artillery. Catamarans used in Brazil consist simply of three logs or wood tapered at the end and lashed together; they carry a sail.

CATA'NIA, or CATANEA, a city and seaport of Sicily, situated on the east coast, near the foot of Mount Etna, 81 miles north-north-west of Syracuse. The fertile and well-cultivated neighborhood of C., extending along the south-east base of Mount Etna, is styled "the granary of Sicily," and has given to C. the title, "La Bella Catania." By eruptions of the great volcano and attendant earthquakes, the city has been several times almost entirely destroyed—especially in the year 1693; but out of its ruins it has always risen with increased beauty, and it is now the finest city in Sicily, being built throughout on a beautiful and consistent plan, from which no deviation is allowed. The harbor of C., formerly good, was choked by a stream of lava in 1693, and the mole was partly destroyed, so that now it has only a roadstead, which is guarded by a fort, and serves as a landing-

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place. It has several squares, the finest of which, in front of the cathedral, has a statue of an elephant sculptured in lava. Among its chief public buildings are the Benedictine convent and church of San Nicolo, with one exception, the grandest structure of the kind in Europe; the town-hall; the cathedral, with its noble granite columns; and the university, founded in 1445. It has besides many handsome churches and convents, and several educational and charitable institutions, and is the seat of one of the three high courts in the island. The inhabitants, formerly much more numerous, amounted in 1872 to 84,897, and are distinguished by their commercial spirit and industry. C. has manufactures of silk and linen goods, and of articles in amber, lava, wood, &c. Among the remains of ancient times that earthquakes have spared, are those of a theatre, an odeium, a temple of Ceres, Roman baths, and an aqueduct. C., anciently known by the name *Catana*, was founded by a Greek colony of Chalcidic origin in the latter part of the 8th c. B.C.; and as early as the beginning of the 5th c. B.C., it was esteemed one of the most flourishing towns in Sicily. It was taken by the Athenians under Nicias, and was desolated by Dionysius I., but again rose under the Roman sway into its former importance. Augustus here founded a Roman colony. It suffered at the hands of the Goths, but once more, under the Byzantine empire, became one of the principal cities in the island. C. gives name to the province of which it is the capital, and which is one of the richest in Sicily, with an area of 1743 square miles, and a population in 1872 of 479,860.—C., GULF OF, an inlet of the Mediterranean, on the east coast of Sicily, extends in the form of a semi-circle from La Trezza Bay to Cape Santa Croce, a distance of 18 miles. It is about 10 miles deep, and receives the river Giaretta.

CATANZA'RO, a city of South Italy, in the province of the same name, is beautifully situated on the declivity of a rocky hill, near the Gulf of Squillace, and in the midst of a very fertile district. On account of its agreeable climate, many wealthy families have made it their residence. It has a cathedral, an old castle of the Norman period, a college, one of the largest, as it is one of the best conducted in the country, and is the seat of one of the four great civil courts of the kingdom. C. suffered very severely by an earthquake in 1783. It has manufactures of silk-velvet and woollen fabrics, and an active trade in agricultural produce. Pop. (1871) 18,781.

CA'TAPLASM (a Greek term for a poultice), an application to diseased or painful parts, for the purpose of promoting suppuration, relieving pain, and stimulating or soothing the skin, according to circumstances. A C. may be composed of any moist pulpy substance of sufficient consistence to retain the water without dripping or soaking through the thin muslin covering in which it is generally wrapped. The making of a poultice well is a matter of some nicety, and unless the proper consistence is given to the mass, the application is apt to do more harm than good. The linseed-meal poultice is the most easily made, and most satisfactory of all soothing applications. The meal is stirred gradually into a sufficient quantity of boiling water, placed in the bottom of a small basin or teacup, until a perfectly smooth pulp is formed of the proper consistence, and in quantity sufficient to cover completely, to the thickness of three-quarters of an inch, the whole pained part. The pulp is then folded up in muslin or thin colico, and applied as soon as the heat will permit it to be borne. The bread and milk, or even bread and water poultice, is also very good; as is also the oatmeal-porridge poultice, to which a little butter may be added with advantage. A spoonful or two of yeast may be added, if there are foul discharges, or peat charcoal may be sprinkled on the surface of the poultice before it is applied. Carrot poultices are in great favor with the people in some parts of the country. Hemlock poultices, made of the fresh leaves, or of the dried leaves, with the aid of some powder of the leaves, form a valuable sedative application in painful diseases; and poppy-heads, or even opium, are sometimes infused in the water of which a poultice is made, for the same purpose. A stimulating C. or poultice may be made by sprinkling oil of turpentine, or chloroform, or mustard in moderate quantity on the surface of any ordinary poultice. When considerable irritation of the skin in a short time is desirable, a mustard C. or sinapism (*sinapi*, mustard) is used.

CATAPU'LTA, an engine of war used by the ancients, somewhat resembling

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the crossbow. In the C., a string or rope, suddenly freed from great tension, gave a powerful impulse to an arrow placed in a groove. There were great catapultas, fixed upon a scaffold with wheels, which were used in sieges, and small ones, carried in the hand which were employed in the field. For a description of similar engines of ancient warfare, see articles BALLISTA and ARBALEST.

CA'TARACT, an opaque condition of the lens of the eye. It is readily distinguished from opacities of the cornea, or clear front part of the eye by its position just behind the pupil—that round and varying aperture in the iris through which light is admitted into the back of the eye. C. may affect the lens alone (lenticular C.), or the front or back of the capsule of the lens (capsular C.), or both lens and capsule (capsulo-lenticular C.). Its whiteness varies from that of half-boiled white of egg to that of snow. Heat will produce a like change on the lens out of the body, just as it changes white of egg from transparent to opaque. The rounded lens of the fish is seen at table in this opaque condition.

C. is painless and unaccompanied by inflammation. It occasions blindness simply by obstructing the passage of the light; but C. alone does not produce so complete blindness but that the patient can tell light from darkness. It may occur at any age, but is most common in elderly persons, and is not unfrequent in children, who may be even born with it. The catoptric test, as it is called, is an ingenious method of distinguishing incipient C. from certain other deep affections of the eye. When a lighted candle is held before the eye of a person whose back is to the window, three candles are seen in the healthy eye. Two are erect—the large front one caused by the convex cornea, the smaller and fainter one behind by the convex front of the lens. The third, occasioned by the concave back of the lens, is in the middle; is small, bright, and turned upside down; and, when the candle is moved, goes in the opposite direction, while the two erect images move with the candle. When the back of the lens becomes opaque, the inverted image is obscured or disappears; and when the front of the lens is affected, only the great front image, caused by the cornea, remains. This curious experiment may be tried on a large scale, by holding a common bi-convex lens a little way behind a watch-glass. Then, on greasing the back of the lens to imitate C., the inverted image disappears, and on turning the lens round, all but the image in the watch-glass disappears.

No medical or other treatment has any influence in arresting the progress of C., nor can it be cured but by a surgical operation. A clever imposture used to be practised by quacks. By applying belladonna to the eye—as the surgeon does when he wishes to dilate the pupil for an examination or operation—some little light was temporarily admitted through the less opaque edge of the lens. The patient beginning to see somewhat better, after long and increasing dimness of vision, began to congratulate himself on a cure; the quack, of course, hastened to get his money without waiting for the further result, which was sure to be blank disappointment. So long as there is fair vision with one eye, the operation on the other may be delayed. It is a mistake to delay the operation in children on account of their tender age. The sooner it is done the better, both for the eye and the education of the child.

Three methods of operation are practised. 1 For *absorption* or solution. This is suitable for children, in whom the C., like the natural lens, is soft, and in all other cases in which there is reason to suppose that the C. is soft. An appropriate needle is passed through the cornea; made to open and lacerate the front of the capsule, the rags of which curl out of the way behind the iris, so that their subsequent opacity does not obstruct the light; then the soft cataractous lens is punctured and picked so as more effectually to admit the aqueous humor, which naturally fills the space between the lens and the cornea, and which has the remarkable property of absorbing or dissolving the lens or cataract when admitted within the capsule. This operation may require to be repeated several times, at intervals of a few weeks, before the whole C. is dissolved. 2. *Displacement.* A needle is passed through the fore part of the white of the eye, until it is seen through the upper part of the pupil, lying across the front of the upper part of the lens. This is now pressed back, so as to make the lens sink down and back into the vitreous humor, when it is either slowly absorbed, or may in part permanently remain. The older method of displacement, termed couching, in which the lens was pushed more directly downwards, is now abandoned, as more likely to press on the retina, and cause subsequent evil to the eye. 3. *Extraction.* Half the

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cornea, through nearly its whole breadth, is divided with Beer's knife, an operation requiring great skill; the front of the capsule is opened, and disposed of with a needle; and the lens is gently assisted out of its place, through the pupil, and out of the opening in the cornea, great care being taken not to allow the vitreous humor to follow. Displacement and extraction are both applicable to hard cataracts, the form it generally takes in old age, as the lens itself becomes naturally harder with age, as well as more flat and amber-tinted. Displacement is more likely to be followed by bad consequences, some time after, from the presence of the displaced lens, while the risk of extraction is greater at the operation. The surgeon must decide which is best for each case. Though not so simple and successful as the operation for absorption through the cornea for soft C., displacement and extraction are generally very successful in restoring vision. The place of the lens is supplied by fluid humor, the refracting power of which is nearly equal to that of the lens, and the restoration of vision may be perfect. All of these operations require minute anatomical knowledge (see EYE), and great nicety and skill in the use of the instruments.

CATA'RRH (Gr. *katarreo*, I flow down), a disease of great frequency in temperate latitudes, especially in changeable moist climates in the winter season. From its well-known connection with sudden falls of temperature, and other epidemic or atmospheric causes (see INFLUENZA), as also from the chill often experienced at the commencement of the disease, it is popularly called *a cold*—a term, however, perhaps somewhat less definite in its meaning than C., which word is usually restricted to the case of a cold affecting the chest, and attended with discharge of mucus by coughing. A "cold in the head" is termed, in strict scientific language, *Coryza*; we shall, however, keep both forms in view in the present article. C., or cold, commonly begins with a feeling of chilliness, which may or may not be attributable to external causes. Sometimes this is absent, there being only a sense of languor and indisposition; not unfrequently there is no sensation of an unusual kind, until a stuffing is experienced in the nostrils, or severe headache, or hoarseness with cough, or oppression of the breathing. The regular form of a cold is to attack the nostrils first, and afterwards the air-passages leading to the chest. When it habitually attacks the chest, without running through its ordinary course as indicated above, there is often some special cause of delicacy in the lungs, or some constitutional tendency towards consumption (q. v.). The discharge is in the beginning watery, becoming afterwards more abundant, glairy, and of yellowish color; the early stages of the disease are attended by considerable irritation of the surfaces affected, and probably no one of the little miseries of life is more prostrating and discouraging for the time than a bad cold in the head. The tendency of C. to attack the chest, and thus to pass into Bronchitis or Pneumonia (q. v.), or to lay the foundation of tubercular disease, constitutes almost its only danger. See CHEST.

The treatment of a cold is commonly a simple matter, so far as the particular attack is concerned. Confinement to the house, and, in severe cases, to bed, or to the sofa, for a day or two; a warm hip or foot bath, to remove the chill; light farinaceous diet, and, if the stomach and bowels are at all loaded, a dose or two of some gentle laxative, are commonly sufficient to subdue the disease. Some persons cure their colds by entire abstinence from food, and as much as possible from drink; others by a large opiate, or by a succession of doses of Dover's powder; others by spirit of Mindererus and paregoric; some even profess to carry out the popular maxim, "stuff a cold, and starve a fever," and maintain, that a good dinner, and a tumbler of whisky or brandy toddy, are the best specifics. That colds get well under all these methods, needs not be denied; but that any violently perturbative or specific practice assists the cure, or shortens the disease, has yet to be proved; and multiplied experience has shewn, that "stuffing a cold" is by no means to be commended. In the later stages, however, a more liberal diet than at first, and in some cases even a moderate allowance of stimulants, affords considerable relief from the feeling of depression that remains for a time on the subsidence of a catarrh. The tendency to this disease, when habitual, and when not dependent on any form of constitutional disorder requiring special means for its cure, is best met by the daily use of the cold bath, with frequent exercise in the open air, and proper ventilation of the sleeping-apartments; also by friction of the skin, and by clothing, which, without being oppressive, is comfortably warm. Exposure to draughts or sudden

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chills, when the surface is perspiring, is to be avoided; but a close confined air habitually breathed in a workshop or bedroom, is a fruitful predisposing cause of the disease.

CATAW'BA, a light sparkling wine, of rich Muscadine flavor, produced in the neighborhood of Cincinnati, Ohio, United States. It is made from a grape called the Catawba grape, "first found growing on the banks of the Catawba River, in Carolina." This wine, which is scarcely known in England, is now in extensive use in North America, where it is gradually superseding the importation of the Rhenish and French sparkling wines, to which, in general character, it bears a resemblance. The vineyards where the C. is produced, are situated on the steep and beautiful slopes with a southern exposure on the banks of the Ohio River, under the shelter of high hills on the north. The first great grower of the C. was Mr Longworth, an esteemed and wealthy proprietor in this quarter, who, embarking in the pursuit less on business considerations than as an enthusiast, succeeded, after much patient care and expense, in producing a wine that throughout the States finds more favor, and commands a higher price than the choicest wines imported. Some of the finer kinds of C. rival the best champagne in delicacy and purity, and are not to be confounded with inferior American imitations.

CATBALO'GAN, or Cadvalo'nga, a town of the Philippines, capital of the island of Samar, on a small bay on the west coast. The houses are mostly constructed of nipa palm, but there are some of stone. Pop. about 7000.

CA'T-BIRD (*Turdus felivox*), an American thrush, of the same group of the mocking-bird, which it resembles in its vocal powers. It is a bird of passage, making its way northward in spring through Georgia and Carolina as far as Massachusetts. It feeds on fruit and berries of all kinds, worms, and insects; builds a large nest of dry twigs, weeds, &c., without any attempt at concealment, in a bush or tree, often in the immediate vicinity of human habitations, and shows extraordinary boldness in the defence of its young. It has its name from a mewing cry which it utters when annoyed by an intruder appproaching too near its nest.

CATCH, a species of musical composition peculiar to England, and in the canon style. The words of the C. are generally humorous, and intended to be sung in social parties over a glass. The music is generally for three voices of which there exist hundreds of specimens from the time of Purcell to the present day. As in the canon, each voice takes up the subject at a certain distance after the first has begun. One of the best specimens of a C. is by Calcott, on Hawkins's and Burney's Histories of Music, where the humor lies in one of the parts repeating "Burney's history"—sounding like "burn his history"—while the others are advocating Hawkins.

CA'TCHFLY, the common English name of several plants of the natural order *Caryophyllaceæ*—as *Silene Armeria, S. Anglica, Lychnis Viscaria*, &c.—which being clammy, in consequence of a peculiar exudation, on the calyx, on the joints of the stem, &c., often prove fatal to insects settling upon them. See LYCHNIS and SILENE.—The name is sometimes employed by botanists as a sort of popular equivalent to *Silene.—Dionœa muscipula* is also sometimes called the Carolina Catchfly. See DIONÆA.

CA'TCHPOLE, a sheriff's officer, or bailiff, is so called in England, probably because he was in use to catch his victim by the *pole*, or head.

CATEAU, Le, or Cateau-Cambresis, a town of France in the department of Nord, situated on the Selle, 14 miles e.-s.-e. of Cambrai. C. has manufactures of shawls, merinoes, calicoes, and leather; it has also breweries and distilleries. Pop. (1872) 9254. It is celebrated as the place where, in 1559, the treaty known as that of Cateau-Cambresis was concluded between Henri II. of France and Philip II. of Spain, by which the former monarch ceded to the latter, Savoy, Corsica, and nearly 200 forts in Italy and the Low Countries.

CA'TECHISM, from a Greek word, *katēcheo*, which means to resound, or sound into one's ears; hence to instruct by word of mouth. Persons undergoing instruction in the principles of Christianity were hence called (*catechumens katechoumenoi*), and the teacher appointed for this purpose was called a *catechist*. Hence any system of teaching by question and answer is called a Catechism.

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Catechisms have long formed one of the principal means employed for popular instruction in the truths and duties of the Christian religion. The composition of the first catechisms was, in all probability, suggested by the ordinary oral instruction of catechumens, and was intended for the help both of teachers and pupils. It appears to have been in the 8th and 9th centuries that the first regular catechisms were compiled, of which that by Kero, a monk of St Gall, and that ascribed to Otfried of Weissenburg, are among the most noted. At later periods, the use of catechisms prevailed chiefly among the opponents of the heirarchy, as among the Waldenses, the Albigenses, the Wickliffites, and, above all, among the Bohemian Brethren. The term C. appears to have been first employed in its present sense among the latter. At an early period in the history of the Reformation, the Reformers began to avail themselves of this method of popular instruction, and their catechisms became important instruments in that great religious movement. In 1520, Luther published his first short catechism. In 1525, Justus Jonas and John Agricola were intrusted with the preparation of a catechism. In 1529, Luther published his Larger and Smaller Catechisms, which found a place among the symbolical books or standards of the Lutheran churches. A number of catechisms were published also by the Swiss Reformers, and by those of England and other countries. The Geneva catechisms, Larger and Smaller, were the work of Calvin. They were published in 1536, were speedily translated into various languages, and became acknowledged standards of the Reformed churches, not only in Switzerland but in the Low Countries, in France, and in Hungary. The Church of Geneva has set aside the authority of these catechisms.—The Zurich C. is received as a standard in the Church of Zurich.—The Heidelberg or Palatinate C. is of greater importance, however, than any other as a standard of the Swiss Reformed churches. It was compiled by the Heidelberg theologians, Caspar Olevian and Zacharias Ursinus, at the request of the Elector Frederick III. of the Palatinate; it was published in 1563, was approved by several synods, and was subjected to a revision by the Synod of Dort.—In the Church of Rome, the Romish or Tridentine C. is of high authority. It was prepared in accordance with the decrees of the Council of Trent, by Archbishop Leon, Marino, Bishop Ægidius Foscorari, and the Portuguese Dominican, Francis Fureiro; revised by Cardinals Borromeo, Sirlet, and Antonian, and sanctioned by Pope Pius V. It was published at Rome in 1566.—The C. of the Orthodox Greek Church was prepared by Peter Mogilas, metropolitan in Kiew, and published in 1642. It received authority as a standard or symbolical book from a synod at Jerusalem in 1672. It is often called the Larger Russian C., to distinguish it from the Smaller C., prepared by order of Peter the Great.—Besides these catechisms, which have a historic interest, or are of importance from their symbolical character, there have appeared at all periods, since the Reformation, many others, both Protestant and Roman Catholic, some doctrinal, some controversial, some devoted to particular subjects, as the sacraments, or to particular purposes, as the preparation of candidates for admission to the Lord's Supper, some adapted to the mental capacity of very young children, &c. The opinion, however, has become prevalent, that doctrinal abstracts are not the best form in which religion can be presented to the young, and the use of catechisms has accordingly been in some measure relinquished in favor of other methods of instruction.

The C. of the Church of England, with which we are most familiar, is the smaller one published in the Book of Common Prayer. It is in two parts: the first contains and explains the Baptismal Covenant, the Creed, the Ten Commandments, and the Lord's Prayer; the second explains the two sacraments, Baptism and the Lord's Supper. It is not known with absolute certainty who was the author of the first part; probably Cranmer and Ridley had the principal hand in framing the questions and answers. It was originally put forth with the 42 Articles in the reign of Edward VI., and condemned as heretical in the reign of Mary. It must not be confounded with Cranmer's C., which was a larger work, differently arranged, and translated chiefly from the German C. used in Nuremberg. This first part of the church C. is spoken of as the *Shorter* Catechism.

There was a *larger* church C. compiled also in the reign of Edward VI., by Ponet, as is supposed, and it corresponds in some degree with the smaller work above described. It was afterwards revised and enlarged by Noel, Dean of St Paul's, and published in 1570; and though never officially promulgated by the church, it has some authority from having been approved by the lower house of Convocation. At

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the Hampton Court Conference, in the reign of James I., the *Shorter* C. was considered too short, and the larger one of Noel's too long; and accordingly, at the king's suggestion, an addition was made to the former of that explanation of the two sacraments which now forms the second part of the church catechism. This was drawn up by Dr Overall. The whole is a work much esteemed by all sections of the church, as remarkable for its simplicity, truth, and catholicity. It, however, states the baptismal theory in a way that is not very acceptable to the extreme Low Church party. The rubrics in the Common Prayer Book enjoin the teaching of the C. in the church on Sundays and holidays after the 2d lesson at Evening Prayer; and the 59th canon contains a like injunction, imposing penalties on the clergy who neglect this. The custom of catechising in the church had fallen into almost universal disuse, but in many parishes it has been revived with excellent results.

The Larger and Shorter Catechisms, which, with the Westminster Confession of Faith, constitute the standards of symbolical books of the Presbyterian churches throughout the British empire and the United States of America, were compiled by the Assembly (q. v.) of Divines at Westminster: the Shorter C. "to be a directory for catechising such as are of weaker capacity:" the Larger, "for catechising such as have made some proficiency in the knowledge of the Christian religion." The Shorter C. was presented to the English House of Commons on 5th November 1647; the Larger on the 14th April 1648; and in July 1648, both received the sanction of the General Assembly of the Church of Scotland—the General Assembly, in the act approving of the Larger C., declaring it to be "a rich treasure for increasing knowledge among the people of God," and that, "they bless the Lord that so excellent a catechism has been prepared." The Shorter C. has, however, been far more generally used for the purpose of instruction than the Larger, which has been generally felt to be too minute in its statements, and too burdensome to the memory to be employed a catechism. Even the Shorter C. is regarded by many, who substantially adhere to its doctrine, as carrying the statement of dogmatic theology beyond what is proper for elementary instruction, whilst it has been long felt to be unsuitable for the very young and the very ignorant, and its use is now almost always preceded by that of catechisms more adapted to their capacity. Its influence, however, has been very great in forming the religious opinions, and in exercising and training the intellectual faculties, wherever Presbyterianism has prevailed; for it has been, and still is, in almost universal use among Presbyterians speaking the English language, and to a considerable extent among Independents or Congregationalists both in Britain and America. In Holland also a translation of it has been much used. It is very generally regarded, by those whose doctrinal views are in accordance with it, as an admirable compend of Christian doctrine and duty.—The authorship of the Westminster Assembly's Catechisms has been the subject of much debate, or at least the authorship of the first drafts of them; it being admitted that they were prepared with great care by committees of the Assembly. But the probability appears to be, that their authorship is to be ascribed entirely to these committees; and that, like the Westminster Confession of Faith, they are thus the result of the joint labors of many. From discoveries made by the late Dr. M'Crie, it seems probable that at least the plan or scheme of the Shorter C. is to be ascribed to Mr Palmer.

CA'TECHU, a substance employed both as a coloring matter and medicinally as an astringent. The C. of commerce is obtained chiefly from East India trees, such as the C. tree (*Acacia Catechu*), betel-nut, &c.; but the greater part of that which is exported from India is made from the C. tree. It is known in India by the name *Kutt;* and C. is said to be a name compounded of two words signifying *the juice of a tree* (*cate*, a tree, and *chu*, juice). CUTCH is another form of one or other of these names, and is a common commercial name. The heart-wood alone of the tree yields C., which is obtained by cutting it into small chips, and boiling it in water, straining the liquid from time to time, and adding fresh supplies of chips, till the extract is of sufficient consistence to be poured into clay moulds, which are usually of a square shape; or when of the thickness of tar, it is allowed to harden for two days, so that it will not run, and is formed into balls about the size of oranges, which are placed on husks of rice or on leaves, and appear in commerce enveloped in them. The C. manufacturers in Northern India move to different parts of the country at different seasons, and erect temporary huts in the jungles, where they carry on their operations. The C. tree abounds chiefly in the Bombay

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and Bengal presidencies; is a small, erect, thorny tree, with a roundish head of (generally) prickly branches. Its sapwood is yellow, the heart-wood dark red. C. is brittle, and can readily be broken into fragments; is soluble in water, and possesses an astringent taste, but no odor. It is a very permanent color, and is employed in the dyeing of blacks, browns, fawns, drabs, and greens. It contains much tannin, and an acid called Catechuic Acid, which can be isolated in white silky crystals. It is often adulterated with earthy substances, but its ready solubility in water and alcohol, should at once shew the presence of such, by leaving them behind in an insoluble state.—The C. of the betel-nut is obtained by boiling first the nuts, and then the extract to a proper consistency. A first boiling of the nuts for some hours is said to yield a black kind of C., called *Kassu;* and a second boiling, after the nuts are dried, a yellowish-brown kind, called *Coury*, which is considered the best, and is sold for the highest price. The former appears in commerce under the name of Colombo C. or Ceylon C. (or Cutch), in the form of circular flat cakes, covered on one side with husks of rice. The latter does not seem to reach Europe—Gambir (q. v.) may be regarded as a kind of catechu. Kino (q. v.) is sometimes confounded with catechu. *Terra Japonica*, or JAPAN EARTH, is an old name for C., not quite disused, which was given to it on the supposition of its being an earthy substance brought from Japan.

CATECHU'MENS (Gr. persons undergoing a course of instruction; see CATECHISM), the appellation given, in the early Christian Church, to those converted Jews and heathens who had not yet received baptism, but were undergoing a course of training and instruction preparatory to it. They had a place assigned them in the congregation, but were not permitted to be present at the dispensation of the Lord's Supper. In the apostolic age, converts appear to have been at once admitted to the sacraments; but afterwards this ceased to be the case, and a period of probation was required. The C. were divided into different classes or grades, according to their proficiency—those of the lowest grade were not permitted to be present during the prayers of the congregation; and those only of the highest, and who had been declared fit to be baptized, at the next administration of the ordinance, were permitted to witness the dispensation of the Lord's Supper.—The term C. was afterwards employed to designate young members of the Christian Church who were receiving instructions to prepare them for confirmation or for the Lord's Supper, and it is still often used in this sense.

CA'TEGORIES. This designation has come down to us from Aristotle. One of the books of his "Organon" or Logical System is so named. The C., or Predicaments, as the schoolmen called them, are to be understood as an attempt at a comprehensive classification of all that exists, for the purposes of logical affirmation, proof, or disproof. The entire universe may be classified in various ways—as into things celestial and terrestrial; into matter and spirit; into organised and unorganised; into minerals, plants, animals, &c. But the classification contemplated under the C. proceeds on the very general properties or attributes that most extensively pervade all existing things, although in unequal degrees. A good example is Quantity, which pertains to everything that we know or can think of. We give the Aristotelian enumeration—the first column is the original Greek; the second, the Latin rendering of the schoolmen; the third, the nearest corresponding English words:

Οὐσία,	Substantia,	Substance.
Ποσόν,	Quantitas,	Quantity.
Ποιόν,	Qualitas,	Quality.
Πρός τι,	Relatio,	Relation.
Ποιεῖν,	Actio,	Action.
Πάσχειν,	Passio,	Passivity.
Ποῦ,	Ubi,	Position in Space.
Πότε,	Quando,	Position in Time.
Κεῖσθαι,	Situs,	Situation.
Ἔχειν,	Habitus.	Possession.

Mr J. S. Mill has the following remarks on the above scheme: "The imperfections of this classification are too obvious to require, and its merits are not sufficient to

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reward, a minute examination. It is a mere catalogue of the distinctions rudely marked out by the language of familiar life, with little or no attempt to penetrate, by philosophical analysis, to the *rationale* even of these common distinctions. Such an analysis, however superficially conducted, would have shown the enumeration to be both redundant and defective. Some objects are admitted, and others repeated several times under different heads. It is like a division of animals into men, quadrupeds, horses, asses, and ponies. That, for instance, could not be a very comprehensive view of the nature of Relation, which could exclude action, passivity, and local situation from that category. The same observation applies to position in time and position in space; while the distinction between the latter and situation is merely verbal."—"Logic," book i., chap. iii., § 1. Some writers have endeavored to save the C. from these objections, by declaring that the fourth, Relation, is to be looked upon as a general head, comprehending the remaining six under it. But there is no evidence that Aristotle had this view in his mind; on the contrary, it appears almost certain that his idea of Relation was too narrow and limited to admit of his giving it so great a comprehension.

Mr Mill gives as the result of his own analysis, the following enumeration and classification of existences or describable things:

1. Feelings, or States of Consciousness; which are the most comprehensive experience that the human mind can attain to, since even the external world is only known as conceived by our minds.

2. The Minds which experience those feelings.

3. The Bodies, or External Objects, which are supposed to excite all that class of feelings that we denominate Sensations.

4. The Successions and Co-existences, the Likenesses and Unlikenesses, between feelings or states of consciousness. Although those relations are considered by us to subsist between the bodies, or things, external to our minds, we are driven in the last resort to consider them as really subsisting between the states of each one's own individual mind.

Mr Mill shews that all possible Propositions—and it is with the truth or falsehood of Propositions that the science of Logic has chiefly to do—affirm or deny one or other of the following properties or facts: Existence—the most general attribute of all—Co-existence, Sequence or Succession, Causation—a peculiar case of Succession—and resemblance. It is to arrive at this classification of Propositions, for the purposes of logic, that the foregoing analysis, corresponding to the Aristotelian C., was made. The properties affirmed of any thing or things, or the things of which any properties are affirmed, come under some one or other of the four heads above given.

The C. of Kant, which are sometimes brought into comparison with those of Aristotle, are conceived under a totally different point of view. See Sir W. Hamilton's "Discussions on Philosophy," 2d edit., p. 26. They refer to certain forms supposed to be inherent in the understanding itself, under which the mind embraces the objects of actual experience. The Kantian philosophy supposes that human knowledge is partly made up of the sensations of outward things—Color, Sound, Touch, &c.—and partly of intuitions existing in the mind prior to all experience of the actual world. This is the point of difference between the school of Locke—who rejected all innate ideas, conceptions or forms—and the school of Kant. No such question was raised under the Aristotelian categories. Kant's enumeration of his innate forms is as follows: 1. Quantity, including unity, multitude, totality; 2. Quality, including reality, negation, limitation; 3. Relation, including substance and accident, cause and effect, action and reaction; 4. Modality, which includes possibility, existence, necessity. These indicate the elements of our knowledge *a priori*; it being the opinion of the author, that such notions as Causation, Necessity, &c., cannot be obtained from the exercise of our senses and intelligence upon the world of realities, but must have been somehow or other imprinted upon the mind originally.

CA'TENARY. The C. is the curve formed by a flexible homogeneous cord hanging freely between two points of support, and acted on by no other force than gravity. If the cord is not homogeneous, and the density varies in any regular way, the cord hangs in a curve slightly different in shape from that of the ordinary catenary. The C. possesses several remarkable properties, one of which is, that its centre of gravity (q. v.) is lower than that of any curve of equal perimeter, and with the same fixed points for its extremities. Where the cord is such that the weight of any part of it is proportioned to its horizontal projection, the curve is a parabola

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(q. v.). The latter curve and the ordinary C. are of importance chiefly in the theory of suspension bridges (q. v.). The properties of the C. will be found fully analysed in all the leading works on mechanics.

CATENI'PORA, a genus of fossil lamelliferous corals peculiar to Palæozoic strata, confined in Britain to the Silurian measures. The genus is easily recognized. The cells are terminal and oval, arranged like a loose net-work of chains, hence called "chain coral." Vertical anastomosing lamellæ united the cells together, and formed a hemispherical polypidom, sometimes of great size.

CATERI'NA, Santa, a town of Sicily, in the province of Caltanisetta, and 7 miles north-north-west of the town of that name. It is situated on a hill near the river Salso, is fortified, has manufactures of fine earthenware; and in the neighborhood are found jaspers and agates of good quality. Pop. 6800.

CA'TERPILLAR, the name given to the larvæ of lepidopterous insects—butterflies, moths, and hawk-moths. Caterpillars exhibit as great differences as subsists among the perfect insects into which they change, and the family, genus, and species may be determined by the characters of the C., as well as of the perfect insect. Their body is generally long, nearly cylindrical, soft, and consisting of twelve rings or segments besides the head, with nine spiracles or small openings for respiration on each side. The head is much harder than the rest of the body, of a sort of almost horny substance, and has six small shining points on each side, which are regarded as simple or *stemmatic* eyes, and is also furnished with two very short rudimentary antennæ. The mouth is adapted for tearing, cutting, and masticating the substances on which the C. is destined to feed, which are very various in the different species, although in all extremely different from the food of the perfect insect: it is provided with two strong *mandibles*, or upper jaws; two *maxillæ*, or lower jaws; a *labium*, or lower lip; and four *palpi*, or feelers. In the mouth also is situated the *spinneret* of those species which, when they change into the chrysalis or pupa state, envelope themselves in silken cocoons. See SILK-WORM. The first three segments of the body are each furnished with a pair of feet, which are hard and scaly, and represent the six feet of the perfect insect; some of the remaining segments are also furnished with feet, varying in all from four to ten in number, the last pair situated at the posterior extremity of the body; but these feet are soft and membranous or fleshy, and armed at their extremity with a sort of circlet or minute hooks. All the feet or legs are very short. Those caterpillars in which the *pro-legs*, as they are sometimes called, or supplementary soft feet, are pretty equally distributed along the body, move by a sort of regular crawling motion; but those which have only four such feet situated near the posterior extremity, move by alternately taking hold by what may be called their fore-feet and their hind-feet, now stretching the body out to its full length, and now bending it into an arch, whilst the hinder part is brought forward almost into contact with the forepart. Caterpillars which move in this way are called *Geometers* or *Loopers*. Some caterpillars have the power of fixing themselves by the two hind feet to a twig, and stretching themselves out as straight as a rod, so that being in color very much like a twig of the tree on the leaves of which they feed they are not readily observed. The muscular power required for this position of rest is very great, and Lyonnet found the number of muscles in a C. to be more than 4000. The skin of some caterpillars is naked, that of others is covered with hairs, spines, or tubercles. Some make for themselves nests or tents of silk, under which they dwell in societies, protected from the inclemency of the weather. Many construct cases or sheaths by agglutinating various substances together, as the C. of the common clothes-moth. Some roll together leaves, and fix them by threads, so forming a dwelling for themselves; and a few burrow and excavate galleries in the substance of leaves. Many feed on leaves; many being limited to a particular kind of plant, or to a few nearly allied plants. Some feed on flowers, some on seeds, some on roots, and some even on the woody portions of stems; some on wool, hides, furs, and other animal substances; a few on lard, and other kinds of fat. Among the admirable arrangements which make all nature harmonious, is the adjustment of the time of each kind of C.'s appearance to that of the leaf or flower on which it is to feed.

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CAT FISH (*Pimelodus*), is a name applied to a well-known genus of fresh-water fishes, of which there are some thirty or more species in the U. S., of the family *Siluridæ*. This family derives its name from the European cat-fish (*Silurus*). The body of these fishes is moderately elongated and tapers backwards from behind the shoulders. The skin is naked. The dorsal fin is near the head; the anal fin is rather large. This is a very large family, embracing quite an hundred genera, and nearly seven hundred species. Most species are found in the fresh-water lakes and rivers. The species, so far as is known, take care of their young, and peculiar provision is made for the protection of the eggs in the mouth of several genera found in tropical waters. FORK-TAILED CAT-FISH (*Ælurichthys Martinus*) ranges from Cape Cod southwards. Mitchill describes this fish as the "Salt-water Cat-fish (*Silurus Martinus*); a splendid fish, twenty inches long and exquisite for eating. It swims with its long dorsal above the surface in the manner of sharks." SEA CAT-FISH (*Ariopsis Milberti.*) The range of this fish is from Cape Cod southwards.

CA'TGUT is employed in the fabrication of the strings of violins, harps, guitars, and other musical instruments; as also in the cords used by clockmakers, in the bows of archers, and in whip-cord. It is generally prepared from the intestines of the sheep, rarely from those of the horse, ass, or mule, and *not* those of the cat. The first stage in the operation, is the thorough cleansing of the intestines from adherent feculent and fatty matters; after which they are steeped in water for several days, so as to loosen the external membrane, which can then be removed by scraping with a blunt knife. The material which is thus scraped off is employed for the cords of battle-doors and rackets, and also as thread in sewing the ends of intestines together. The scraped intestines are then steeped in water, and scraped again, when the large intestines are cut and placed in tubs with salt, to preserve them for the sausage-maker; and the smaller intestines are steeped in water, thereafter treated with a dilute solution of alkali (4 oz. potash, 4 oz. carbonate of potash, and 3 to 4 gallons of water, with occasionally a little alum) and are lastly drawn through a perforated brass thimble, and assorted into their respective sizes. In order to destroy any adherent animal matter, which would lead to putrefaction, and the consequent development of offensive odors, it is customary to subject the C. to the fumes of burning sulphur—sulphurous acid, which acts as an antiseptic (q. v.), and arrests decomposition. The best strings are used for musical instruments; and those which come from Italy, and are known as "Roman strings," are the strongest. They are remarkable for their clearness and transparency. Cord for clockmakers is made from the smallest of the intestines, and occasionally from larger ones, which have been split longitudinally into several lengths. Whip-cord is fabricated from C. which has been twisted in a manner somewhat similar to single-corded ropes. The C. obtained from the intestines of horses, asses, and mules is principally made in France, and is employed instead of leather-belts for driving machinery.

CA'THA, a genus of the natural order *Calastraceæ*. The fruit is a three-cornered capsule.—*C. edulis*, sometimes called ARABIAN TEA, the KHAT of the Arabians, is a shrub with erect smooth branches, elliptical obtusely serrated leaves, and small flowers in axillary cymes. It is a native of Arabia, and the Arabs ascribe to its leaves, even carried about the person, extraordinary virtues as a preventive of plague, with probably about as much reason as our forefathers had for esteeming the rowan tree formidable to witches. When fresh, they are stimulant, narcotic, and intoxicating, and are eaten with greediness by the Arabs. They are very antisoporific, so that a man, after using them, may keep watch for a whole night without drowsiness.

CA'THARI or Ca'tharists (Gr. pure), a name very generally given to various sects which appeared in the Church during the middle ages. It appears to have been sometimes assumed in profession of a purity of doctrine and morals superior to that which generally prevailed in the church, sometimes bestowed ironically in ridicule of such a profession, and perhaps was first used as a designation of the Paulicians (q. v.). It became a common appellation of sects which appeared in Lombardy in the beginning of the 11th c., and afterwards in France and the west of Germany. Having some connection with the Bulgarian Paulicians, they were some-

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times called *Bulgarians*; sometimes also *Patarenes* or *Paterines*, sometimes *Publicans* or *Popelitans*, and in the Low Countries, *Piphles*. The names *Albigenses* and C. are often used as equivalent to one another; but we are under the disadvantage of having to depend entirely on the writings of very bigoted adversaries for our knowledge of their doctrines and practices, and considerable obscurity rests on all this interesting part of ecclesiastical history. Manichæism, Gnosticism, and Montanism are ascribed to the C.; but there is much reason to think that the errors of a few were often indiscriminately charged upon all, and that such charges indeed sometimes rested on ignorant or wilful misconstruction. It appears quite certain that the C. differed considerably in their doctrines and in the degree of their opposition to the dominant church. Some of them advocated and practised a rigid ascetism. There is no good evidence that any of them nearly approached to the doctrines of the Reformation; although in their rejection of tradition, of the authority of Rome, of the worship of saints and images, &c., there are notable points of agreement with the views of the Reformers.

CA'THARINE is the name of several saints of the Roman Catholic Church. The simple designation of *Saint C.*, however, is given to a virgin, said to have been of royal descent in Alexandria, who, publicly confessing the gospel at a sacrificial feast appointed by the Emperor Maximinus, was put to death in 307 A.D., after being tortured on a wheel. Hence the name of "St Catharine's wheel." Very extraordinary legends exist as to her converting 50 philosophers sent by the emperor to convert her in prison, besides a multitude of other persons; the conveyance of her head by the angels to Mount Sinai, &c. She is regarded as the patroness of girls' schools.—*St C. of Siena*, one of the most famous saints of Italy, was the daughter of a dyer in Siena, and was born there in 1347 A.D.; practised extraordinary mortifications; and was said to be favored with extraordinary tokens of favor by Christ, whose wounds were impressed upon her body, &c. She became a Dominican, and therefore afterwards a patron saint of the Dominicans. She wrote devotional pieces, letters, and poems, which have been more than once printed; the best edition appeared at Siena and Lucca, in 1707—1713, in 4 vols. 4to under the title of "Opere dalla serafica Santa Catarina.—*St C. of Bologna* and *St C. of Sweden* are of less note.

CATHARINE I. Empress of Russia, was originally by name Martha Rabe, and was the posthumous daughter of John Rabe, a Swedish quarter-master in Livonia. Her mother died in 1685, when she was but three years old. Left helpless and destitute, a parish-clerk took compassion on her, and supported her, and a Lutheran clergymen in Marienburg afterwards received her into his house as an attendant on his children. In 1701, she married a Swedish dragoon, who next year was called to active service; and Marienburg being taken by the Russians, she became for some time the mistress of General Bauer; and afterwards entering the service of the Princess Menchikoff, she attracted the notice of Peter the Great. In 1703 she went over to the Greek Church, and took the name of Catharina Alexiewna. After being for some years the emperor's mistress, she was privately married to him in 1711; the marriage was publicly avowed in 1712; she was proclaimed empress in 1718, and was crowned at Moscow in 1724. She bore eight children to the emperor, all of whom died in childhood, except two daughters, Anne and Elizabeth, the latter of whom was afterwards Empress of Russia, and the former married the Duke of Holstein, and was the mother of the Emperor Peter III. When Peter the Great and his army seemed entirely in the power of the Turkish army on the Pruth in 1717, C., who was with him, sought an interview with the Grand Vizier, and, by employing her jewels to bribe his attendants, succeeded in procuring the deliverance of the Russians. Her conduct on this occasion excited so much admiration and gratitude in the emperor, that he resolved to appoint her his successor. Yet in the end of the year 1724, she became the object of his displeasure and suspicion, on account of an alleged intimacy with a chamberlain, whom he caused to be beheaded. Menchikoff, who had always been attached to her interests, was at this time in disgrace. But she had contrived in a great measure to recover her position, when, on 28th January 1725, Peter the Great died. His death was kept secret as long as possible, that everything might be arranged for her taking possession of the throne; and the Archbishop of Pleskow came forward and declared before the troops and people, that the emperor, on his death-bed, had declared her alone worthy to be his successor. The hostility and

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hesitation of the nobles were at once overcome, and C. was acknowledged as Empress and sole Ruler of All of the Russias. Under Menchikoff's direction, the affairs of government went on well enough for a time; but the empress ere long began to yield to the influence of a number of favorites, addicted herself to drunkenness, and lived such a life as could not fail to hurry her to the grave. She died, however, unexpectedly, 17th May, 1727.

CATHARINE II., Empress of Russia was born at Stettin on 25th April 1729. Her father, the Prince of Anhalt-Zerbst, was a Prussian field-marshal, and governor of Stettin. She received the name of Sophia Augusta; but the Empress Elizabeth of Russia having selected her for the wife of her nephew and intended successor, Peter, she passed from the Lutheran to the Greek Church, and took the name of Catharina Alexiewna. In 1745, her marriage took place. She soon quarreled with her husband, and each of them lived a life of unrestrained vice. Among his attendants was a Count Soltikow, with whom her intimacy soon became scandalous; and Soltikow was sent on an embassy abroad. But the young Polish count, Stanislaus Poniatowski, almost immediately supplied his place. After the death of the Empress Elizabeth in 1761, Peter III. ascended the Russian throne; but the conjugal difference became continually wider. C. was banished to a separate abode; and the emperor seemed to entertain the design of divorcing her, declaring her only son, Paul, illegitimate, and marrying his mistress, Elizabeth Woronzow. The popular dislike to Peter, however, rapidly increased; and at length, he being dethroned by a conspiracy, C. was made empress. A few days afterwards, Peter was murdered (July 1762). What participation his wife had in his murder, has never been well ascertained.

C. now exerted herself to please the people, and among other things, made a great show of regard for the outward forms of the Greek Church, although her principles were, in reality, those of the infidelity then prevalent among the French philosophers. The government of the country was carried on with great energy; and her reign was remarkable for the rapid increase of the extent and power of Russia. Not long after her accession to the throne, her influence secured the election of her former favorite, Stanislaus Poniatowski, to the throne of Poland. In her own empire, however, discontentment was seriously manifested, the hopes of the disaffected being centred in the young prince Ivan, who was forthwith murdered in the castle of Schlüsselburg. From that time, the internal politics of Russia long consisted in great part of court intrigues for the humiliation of one favorite and the exaltation of another. The first partition of Poland in 1772, and the Turkish war which terminated in the peace of Kuluardji in 1774, vastly increased the empire. The Turkish war which terminated in the peace of Jassy in 1792, had similar results, and also the war with Sweden, which terminated in 1790. The second and third partitions of Poland, and the incorporation of Courland with Russia, completed the triumphs of C.'s reign. She began a war with Persia, however, and cherished a scheme for the overthrow of the British power in India; but a stroke of apoplexy cut her off on November 9, 1796. She was a woman of great ability; but, utterly devoid of principle, she shrunk from no crime, and sensuality and ambition governed all her actions. She was shameless in vice; and always had a paramour, who dwelt in her palace, and might be regarded as filling an acknowledged office of state, with large revenues and determinate privileges. Yet distinguished authors flattered her; and she invited to her court some of the literati and philosophers of France. She was ever ready to commence great undertakings, but most of them were left unfinished; and little was really accomplished in her reign for the improvement of the country, or the progress of civilisation. On a visit to the southern provinces of the empire in 1787, she was gratified by a perpetual display of fictitious wealth and prosperity along the whole route. This imperial progress was also a triumphal procession of her vile favorite Potemkin (q. v.).

CATHARINE DE' MEDICI, the queen of Henri II. of France, was the daughter of Lorenzo de Medici, Duke of Urbino, and was born at Florence in 1519. In her fourteenth year, she was brought to France, and married to Henri, the second son of Francis I. The marriage was a part of the political schemes of her uncle, Pope Clement VII., but as he died soon after, she found herself friendless and neglected at the French court. In these circumstances, she

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conducted herself with a submission which seemed to indicate a want of proper spirit, but which gained her the favor of the old king, and in some measure also of her husband. It was not till the accession of her eldest son, Francis II., in 1559, that her love of power began to display itself. The Guises at this time possessed a power which seemed dangerous to that of the throne, and C. entered into a secret alliance with the Huguenots to oppose them. On the death of Francis II. in 1560, and accession of Charles IX., the government fell entirely into her hands. Caring little for religion in itself, although she was very prone to superstition, she disliked the Protestants, chiefly because their principles were opposed to the absolute despotism which she desired to maintain. Yet she sought to rally the Protestant leaders around the throne, in order to remove the Guises. This attempt having failed, and the civil war which ensued having ended in the peace of Amboise, highly favorable to the Protestants, she became alarmed at the increase of their power, and entered into a secret treaty with Spain for the extirpation of heretics; and subsequently into a plot with the Guises, in which at first only the murder of the Protestant leaders was contemplated, but which resulted in the fearful massacre of St Bartholomew's Day. This event brought the whole power of the state into the hands of the queen-mother, who boasted of the deed to Roman Catholic governments, and excused it to Protestant ones, for she now managed all the correspondence of the court. About this time she succeeded, by gold and intrigues, in getting her third son, afterwards Henri III., elected to the the Polish throne. But her arbitrary and tyrannical administration roused the opposition of a Roman Catholic party, at the head of whom was her own fourth son, the Duke of Alençon, who allied themselves with the Protestants. It was very generally believed that she was privy to the machinations that led to his death. When, after the death of Charles IX., Henri III. returned from Poland to be king of France, his mother still ruled the court, and had the principal share in all the intrigues, treacheries, and political transactions of that woful period. Having betrayed all who trusted them, she and her son found themselves at last forsaken and abhorred by all. The League and the Guises had no more confidence in them, than had the Protestants and Henri of Navarre. Vexation on this account preyed on the proud heart of the queen-mother in her last days; and amidst the confusion and strife of parties, she died at Blois, on 5th January 1589, unheeded and unlamented. Her ruling passion was ambition, and to this she was ready to sacrifice everything. Her unprincipled policy had almost subverted the French monarchy; her extravagance and luxury exhausted the finances of the country. Her influence was powerful in increasing the demoralisation of the court and of society. She unscrupulously employed beauties of her train to corrupt men from whose power she apprehended danger.

CATHARINE OF ARAGON, Queen of England, the first wife of Henry VIII., and fourth daughter of Ferdinand and Isabella, king and queen of Castile and Aragon, was born December 1485. She occupies a prominent place in English history, not for what she herself was, but for what she was the occasion of—the Reformation. Married, when scarcely sixteen, to Arthur, Prince of Wales, son of Henry VII., she was left a widow within a year; and in the course of a few months more a second marriage was projected for her by her father-in-law, with his second son Henry, as yet a boy of only twelve years old. The pope's dispensation enabling such near relatives to marry was obtained in 1503, and the marriage took place in June 1509, immediately after Henry's accession to the crown as Henry VIII. Although Henry was very far from being a model husband, he appears to have treated Queen C., who had borne him several children, with all due respect, until about 1527, when he conceived a passion for Anne Boleyn (q. v.). He now expressed doubts as to the legality of his marriage, and set about obtaining a divorce. Pope Clement VII. would readily have annulled the marriage permitted by his predecessor, had he not feared Queen C.'s powerful nephew, the Emperor Charles V. He, however, granted a commission to Campeggio and Wolsey, to inquire into the validity of the marriage; but before these prelates Queen C. refused to plead, and appealed to the pope. The king craved judgment. The legates cited the queen, and declaring her contumacious when she appeared not, went on with the cause; but the wily Campeggio, anxious only for time for his master when the king expected an answer, prorogued the court until a future day. The king consulted the universities of Europe, many of which declared the marriage invalid. The pope now summoned

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toe king to Rome, but Henry haughtily refused to appear either himself, or by deputy, which he maintained would be to sacrifice the prerogatives of his crown: and setting the pope at defiance, married Anne Boleyn. Cranmer, shortly afterwards (1533), declared the first marriage void, and Pope Clement annulled Cranmer's sentence, making the separation from Rome complete. Queen C. did not quit the kingdom, but took up her residence first at Ampthill, in Bedfordshire, and afterwards at Kimbolton Castle, Huntingdonshire, where she led an austere religious life until her decease in January 1536. Queen C.'s personal character was unimpeachable, and her disposition sweet and gentle.

CATHARINE PARR, the sixth wife of Henry VIII., was the daughter of Sir Thomas Parr, and was born in 1513. Married first to Lord Burgh, and afterwards to Lord Latimer, she, in July 12, 1548, became queen of England by marriage with Henry VIII. She was distinguished for her learning and her knowledge of religious subjects, her discussion of which with the king had well-nigh brought her to the block, like so many of her predecessors. Her tact, however, saved her, and brought rebuke on her enemies; for she made it appear to the king's vanity, that she had only engaged him in discourse about the Reformation, in order to derive profit from his majesty's speech. She persuaded Henry to restore the right of succession to his daughters, and interested herself on behalf of the universities. After Henry's death, she married, 1547, Sir Thomas Seymour, and died the following year, not without suspicion of poison,

CATHARINE'S, St College, or Hall, Cambridge, was founded by Robert Wodelarke, Provost of King's College, 1473, for a master and three or more fellows. The visitors sent down to the university by Edward VI. ordered that there should be then six fellows, and in future a greater or less number as the revenues permitted The statutes confirmed in May 1860 provide that there shall be a master and nine fellows. There are twenty-five scholars. Edwyn Sandys, Archbishop of York, Bishop Overall, and Bishop Sherlock, were of this college.

CATHA'RTICS (Gr. *kathairō*, I purify), a name originally for all medicines supposed to purify the system from the matter of disease (*materies morbi*), which was generally presumed by the ancients to exist in all cases of fever and acute disease (see CRISIS), and to require to be separated or thrown off by the different excretions of the body. Ultimately the term C. became limited in its signification to remedies acting on the bowels, which are popularly called *purgatives*—a mere translation of the Greek work. The principal C. are aloes, gamboge, colocynth, rhubarb, scammony, jalap, senna, Epsom and other salts, and castor oil. Sulphur and cream of tartar form a well known mild laxative; magnesia is also useful in many cases of indigestion with acidity. Croton oil and elaterium belong to a more dangerous class of C., as also does the favorite remedy of the ancients—the black hellebore. The doses and use of the more ordinary remedies of this class are explained in all works on medicine. See CONSTIPATION.

CATHA'RTINE, or Bitter of Senna, is the essential principle in senna which possesses laxative or purgative properties. It can be isolated as a yellowish-red uncrystallizable solid, which is deliquescent, soluble in water and alcohol, insoluble in ether, has a very bitter nauseous taste, a characteristic odor, and possesses great purging powers, accompanied by nausea and griping. Three grains of C. are a full dose.

CATHCA'RT, William Shaw, Earl, a British general and diplomatist, son of Baron Cathcart of Cathcart, County of Renfrew, was born September 17, 1755. Having studied at Glasgow, he entered the army, took a prominent part in the American war, and fought with distinction in Flanders and North Germany. In 1801, he was made lieutenant-general, and in 1803, commander-in-chief for Ireland. In 1805, he was engaged on a diplomatic mission to the Czar Alexander. In July 1807, he received the command of the land-forces employed to co-operate with the fleet in the attack on Copenhagen, and, for his services in this capacity, was made a British peer, with the title of viscount, and received a vote of thanks from both Houses of parliament. January 28, 1808. In 1812, he was sent as ambassador to St Petersburg, accompanied the Czar Alexander in the campaigns of 1813 and 1814, and was present at the congresses of Chatillon and Vienna. He was raised to the rank of earl, June 18, 1814. The latter years of his life were chiefly spent at his country residence, Cartside, near Glasgow, where he died June 14, 1842.—His eld-

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est son, CHARLES MURRAY, EARL CATHCART (formerly known as Lord Greenock), was born 1783; served in Spain and at Waterloo under Wellington; afterwards acted in Canada; and was made a general, and colonel of the 1st Dragoon Guards. He died July 1859.

CATHCART, Sir George, son of William, Earl Cathcart, was born in London, 1794. Educated at Eton and Edinburgh, he, in 1810, joined the 2d Life Guards, and fought with the grand army in the campaigns of 1812 and 1813; and as aide-de-camp to the Duke of Wellington, was present at Quatre Bras and Waterloo. In 1828, he was made lieutenant-colonel, and served in British America and the West Indies for about eight years; and in 1837 he proved himself an energetic and efficient officer in quelling the outbreak in Canada, where he remained for more than six years. In 1852, having held the appointment of deputy-lieutenant of the Tower for some years, he was made governor of the Cape of Good Hope with command of the forces, and in this capacity succeeded in bringing to a successful end the harassing Kaffir war. He returned to England in time to be sent out to the Crimea as general of division. His bravery here was conspicuous, especially in the battle of Inkermann, where the odds were so terribly against the British forces, and where he was slain. He was buried on the spot where he fell, and which, in his honor, was named Cathcart's Hill. C. was the author of a very valuable work, entitled "Commentaries on the War in Russia and Germany in 1812 and 1813" (London, 1850.)

CATHE'DRAL, from a Greek word *cathedra*, signifying a *seat*. Thus, "to speak *ex cathedrâ*," is to speak as from a *seat* of authority. The C. city is the seat of the bishop of the diocese, and his throne is placed in the C. church, which is the parish church of the whole diocese. The diocese was, in fact, anciently called *parochia*, until the application of this name to the smaller portions into which it was divided. A C. town has generally been understood to be entitled to the honors of a city, even although the town be not a borough incorporate; but in the case of Manchester, the claim was disallowed by a court of law. The distinction between C. and collegiate churches consists principally in the see of the bishop being at the former. The governing body of a C. is called the dean and chapter—i. e., the dean and canons who meet for corporate purposes in the chapter-house of the cathedral. The property of the C. vests in this body. They elect the bishop of the diocese on the issue of a *congé d'élire* from the crown, but as the person to be elected is always named, and they may be compelled by a mandamus to elect that person and no other, the election is merely a form.

The bishop is "visitor" of the dean and chapter. In England, by the act of 1840, all members of cathedrals, except the dean, are styled canons. Their *seat* in the C. is called their *stall*. They are no longer called prebends. Canons must reside 8 months in each year. The act allows to the canons of Durham, Manchester, St Paul's, and Westminster, an income of £1000 per annum; to those of every other C. in England, £500. The bishop was always considered of common right to have the patronage of canonries, but formerly there were exceptions. Now, the appointment to all canonries is vested either in the bishop, or in the crown. Where the bishop is patron, he "collates," and the dean and chapter "induct," by placing the new canon in a stall in the church. The crown appoints by letters-patent, and the canon is installed without collation. Honorary canons have no emoluments, but rank after the canons. Minor canons, of whom there are from 2 to 6 in each C., perform the daily choral services. The C. service is the usual Church of England service intoned with an anthem and the Psalms chanted. For the general plan of C. buildings, see CHURCH. The more remarkable cathedrals will be noticed under the names of the towns in which they are situated. In England, the number of cathedrals is 29.

CATHELINEAU, Jacques, general of the army in La Vendée, in the west of France, was born January 5, 1759, in very humble life, at Pin-en-Mauges, in Lower Anjou. Horrified at the atrocities and despotic acts of the Convention, he placed himself in opposition to it, and soon collected around him a body of loyal peasantry, whom he led against and defeated the Republicans in several conflicts. After the victory of Saumur (q. v.), the council of generals appointed him, as having the greatest influence over his countrymen, commander-in-chief. He immediately determined to make an attack upon Nantes, and managed to penetrate into the town, where he was wounded by a musket-ball, and his troops immediately dispersed. He

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was carried to St Florent, where he died July 11, 1793. He was a man of great simplicity and honesty of character, and his piety was such, that he was called the Saint of Anjou.

CA'THERINE-WHEEL (see CATHARINE, ST) is frequently used as a charge in coats of arms, when it is represented with teeth.

CA'THETER (Gr. *kathiemi*, to thrust into). was a name applied indifferently to all instruments used for passing along mucous canals. In modern times, however, it has generally been reserved for tubular rods through which fluids or air may pass, and which may give free exit to the accumulated contents of such organs as the urinary bladder. The C. for the latter purpose is a very old surgical instrument. The ancients made theirs of copper, which accumulated verdigris. In the 9th c. silver was substituted by the Arabian surgeons as a cleanlier metal, and is still used by all who are not obliged, for economical reasons, to have their catheters made of German silver or pewter. The urinary C. for the male varies in length from 10 to to 11 inches; the female C. need not be more than 4 or 5 inches. The form is a matter of indifference, but most surgeons prefer an instrument straight to within the last few inches of its length; the latter should be curved into the segment of a small circle. Others, however, use a double curve, and, indeed, nearly every surgeon has a peculiar fancy in this respect.

Flexible catheters are made of gum elastic, which may be used either alone or supported on a wire. Many other materials have been proposed. Of late years, gutta percha has been used, but owing to some awkward accidents—such as portions often breaking off in the bladder—it has not been generally adopted by surgeons.

CA'THODE. See ANODE.

CATHOLIC CHURCH. The term catholic literally signifies *universal*. The phrase C. C. is therefore equivalent to "universal church," and cannot properly be applied to any particular sect or body, such as the Roman, Anglican, Genevan, Reformed Lutheran, or Presbyterian, all of which form merely portions more or less pure of the "church universal." It was first employed to distinguish the Christian Church from the Jewish; the latter being restricted to a single nation, whereas the former was intended for the world in general. Afterwards, it served to mark the difference between the orthodox Christian Church and the various sects which sprang from it, such as the Cerinthians, Basilidians, Arians, Macedonians, &c. The name has been retained by the Church of Rome, which was the visible successor of the primitive one; and although Protestant divines have been careful to deny its applicability to a church which they consider buried under the corrupt accretions of centuries, yet the term catholic is still used by the populace of almost every Protestant country as synonymous with Roman Catholic, so that from their minds all conception of the literal meaning of the word has vanished. For an account of the Church of Rome, see art. ROMAN CATHOLIC CHURCH.

CA'THOLIC CRE'DITOR, in the law of Scotland, is one whose debt is secured over several or the whole subjects belonging to the debtor—e. g., over two or more heritable estates for the same debt. The C. C. is bound so to exercise his right as not unnecessarily to injure the securities of the other creditors. Thus, if he draws his whole debt from one of the subjects, he must assign his security over the others to the postponed creditors.

CATHOLIC (ROMAN) EMANCIPATION ACT (10 Geo. IV., c. 7). To render this famous measure intelligible, and still more to convey a conception of its importance to younger readers, it is necessarily that we should preface our account of it by a slight sketch of the position of our Roman Catholic fellow-subjects before it was passed. From first to last, the sufferings of the Roman Catholics were the fruit of political tyranny quite as much as of religious rancor or fanaticism, and their release was effected by a change in the political rather than in the religious views or feelings of the dominant party. The first occasion on which even a promise of a different line of policy from that which had been originally adopted was held out to the Roman Catholics of Ireland, was on the termination of the revolutionary war in 1691; and had King William been able to carry out the views which his personal enlightenment and liberality dictated, it is probable that Catholic emancipation would have been hastened by more than a century. But the English parliament, which was intensely anti-Roman Catholic, enacted, on the 22d October;

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1691, that Irish members of both Houses should take the oaths of supremacy and three years later, a set of acts were passed, which placed the Roman Catholics in a worse position than at any previous period of their history. The whole population was disarmed, and the priests banished from the country. But what must have been still more intolerable, was the interference with the private arrangements of their families. All Roman Catholics were prohibited from acting as guardians not only to Protestant, but to Catholic children. At a somewhat later date (1704), it was enacted that if a son chose to turn Protestant, he should be entitled to dispossess his father, and at once to take possession of the family estate. Though Catholics were not directly declared incapable of holding land, they were deprived of the right of acquiring it by purchase, or even by long lease; and if a Catholic chanced to occupy a place in a line of entail, he was passed over in favor of the next Protestant heir. No office of trust, civil or military, was now open to a Catholic; he was forbidden to vote at elections, to intermarry with a Protestant, or even to dwell in Limerick or Galway, except under certain conditions. But perhaps the most demoralising provision of all, was that which empowered the son of a Catholic to bring his father into Chancery, to force him to declare on oath the value of his property, and to settle such an allowance on him as the court should determine, not only for the father's life, but the son's.

Amongst the other burdens of this heavy time, may be mentioned the exclusion of Catholics from the profession of the law, and the regulation that if a Protestant lawyer married a Catholic, he should be held to have gone over to her faith: the prohibition against Catholics acting as schoolmasters, under the penalty of being prosecuted as convicts, by which the whole body was virtually excluded from the benefits of education: and the still more summary enactment, that if a priest celebrated marriage between a Protestant and a Catholic, he should be hanged. But as years passed away, the memory of the foul deeds of the Inquisition and the confessional, and of the other enormities of which Roman Catholics had been guilty in their days of power, waxed fainter; milder feelings began to prevail; and when Grattan appeared as the champion of their rights, the field was already in some degree prepared for his labors. Favored by such influences, of which no one knew better how to avail himself, he succeeded, in 1780, in carrying, in the Irish parliament, the famous resolution, "that the king's most excellent majesty, and the Lords and Commons of Ireland, are the only competent power to make laws to bind Ireland." Many of the disqualifying statutes were now repealed, and the claim for complete equality with Englishmen and Protestants, or complete separation from the sister-country, was now formally urged. From this period till the final liberation was achieved, there was no rest. The Irish rebellion of 1798 brought home to the English nation the dangers to which it would constantly be exposed till the question was finally adjusted. The Act of Union of 1800 was the immediate consequence of that outbreak; and to this act the Irish were induced to consent by a virtual pledge entered into by Mr Pitt, to the effect that the Catholic disabilities should be at once removed. But, like William of Orange, Pitt had pledged himself to more than he was able to accomplish. The king was seized with scruples regarding the obligations imposed upon him by his coronation oath, and made a vigorous stand against the proposals of his minister.

At a subsequent period, efforts were made in the direction of emancipation by Mr Canning and Lord Castlereagh. About 1824, the press began to take up the question warmly; a Catholic Association was formed, to prepare petitions to parliament; the Irish priests stimulated their flocks to subscribe for the purposes of agitation; O'Connell rapidly became a power; and as early as March 1825, the importance of the question was so deeply felt, that Sir F. Burdett ventured to introduce a relief bill, which passed the Commons by a majority of 268 to 241, but was rejected by the Lords. A slight temporary reaction now took place, the superstitious fears of ignorant Protestants being excited by a "no-popery" cry, and in consequence, a new relief bill, introduced in 1827, though supported by the last effort of Canning's eloquence, was lost in the Commons by a majority of 4. But the liberal view of the Roman Catholic claims was essentially the popular one—at least among the enlightened classes, and as a proof of this, under the hostile administration of the Duke of Wellington, the very same resolution which had been lost in 1827 by a minority of 4, was carried in 1828 by a majority of 6. The duke himself now began to waver in

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opinion, so that the beginning of the end was manifestly near. During O'Connell's famous canvass for the county of Clare, the duke declared in the House of Lords, "if the public mind were now suffered to be tranquil, if the agitators of Ireland would only leave the public mind at rest, the people would become more satisfied, and I certainly think it would then be possible to do something." O'Connell's return for Clare, notwithstanding the existence of the oaths which precluded him from taking his seat in the House, and the events which now followed in quick succession, made it clear that the "something" of which the duke had spoken must be the passing of the emancipation bill in the ensuing session. The king's speech, which was read on the 5th February of the following year, accordingly contained a recommendation to parliament, to consider whether the civil disabilities of the Catholics could not be removed, "consistently with the full and permanent security of our establishments in church and state."

On the 5th March, Mr Peel brought forward the great measure. The majority on the motion in the Commons for going into committee was 188, in a house of 508 members; the debate on the second reading issued in a majority of 180; and the final majority, after the bill had passed through committee, in which not one of the many amendments proposed was carried, was 178 in a House of 462. In the Lords, the debate lasted three nights, the majority being 106 in favor of the second reading of a bill which, nine months before, the same House had refused, by a majority of 45, even to entertain—so rapid and threatening had been the progress of the agitation. On the 13th April 1829, this famous measure became the law of the land. It now only remains that, by mentioning the provisions of the act, we sum up the results of one of the most important controversies that ever agitated the inhabitants of this country. For the oath of supremacy, another oath was substituted, by which all Catholic members of parliament bound themselves to support the existing institutions of the state, and not to injure those of the church (see ABJURATION). Catholics were admitted to all corporate offices, and to an equal enjoyment of all municipal rights. The army and navy had already been opened to them. On the other hand, they were excluded from the offices of Regent, of Chancellor of England or Ireland, and of Viceroy of Ireland; from all offices connected with the church, its universities and schools, and from all disposal of church patronage. The most important security related to the franchise, in which a £10 was substituted for a 40s. qualification in Ireland. The clergy of the R. C. Church were left in the position of other dissenters, the government having declined either to endow them, or to introduce any machinery for prying into their relations to the pope. But the public use of their insignia of office, and of episcopal titles and names, was denied them; the extension of monachism was prohibited; and it was enacted that the number of Jesuits should not be increased, and that they should henceforth be subject to registration. For further information, see Miss Martineau's "History of England during the Peace from 1815 to 1846." W. & R. Chambers, 1858.

CATHOLIC EPISTLES, the name given, according to Clemens Alexandrinus and Origen, to certain epistles, addressed not to particular churches or individuals, but either to the church universal or to a large and indefinite circle of readers. Originally the C. E. comprised only the first epistle of John and the first of Peter, but, at least as early as the 4th c. (as evinced by the testimony of Eusebius), the term was applied to all the apostolic writings used as "lessons" in the orthodox Christian churches. But this included the Epistle of James, of Jude, the 2nd of Peter, and the 2d and 3d of John. These seven thus constituted the C. E., although the genuineness and authenticity of the last mentioned five were not universally acknowledged; but this very incorporation with epistles whose canonicity was not questioned, naturally had the effect of confirming their authority, so that in a short time the entire seven came to be considered a portion of the canon.

CATHO'LICOS, the title of the patriarchs or chief ecclesiastics in the hierarchy of the Armenian Church, and of the Christians of Georgia and Mingrelia.

CATILI'NA, Lu'cius Se'rgius, descended from a patrician but impoverished family, was born about the year 108 B.C. During his youth, he attached himself to the party of Sulla. His bodily constitution, which was capable of enduring any amount of labor, fatigue, and hardship, allied to a mind which could stoop to every baseness and feared no crime, fitted him to take the lead in the conspiracy which

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has made his name infamous to all ages. In the year 68 B.C. he was elected prætor; in 67 B.C., governor of Africa; and in 66 B.C., he desired to stand for the consulship, but was disqualified on account of the accusations brought against him of maladministration in his province. Disappointed thus in his ambition, and burdened with many and heavy debts, he saw no hope for himself but in the chances of a political revolution, and therefore entered into a conspiracy, including many other young Roman nobles, in morals and circumstances greatly like himself. The plot, however, was revealed to Cicero by Fulvia, mistress of one of the conspirators. Operations were to commence with the assassination of Cicero in the Campus Martius, but the latter was kept aware of every step of the conspiracy, and contrived to frustrate the whole design. In the night of November 6 (63 B.C.), Catiline assembled his confederates, and explained to them a new plan for assassinating Cicero; for bringing up the Tuscan army (which he had seduced from its allegiance), under Manlius, from the encampment at Fæsulæ; for setting fire to Rome, and putting to death the hostile senators and citizens. In the course of a few hours, everything was made known to Cicero. Accordingly, when the chosen assassins came to the house of the consul, on pretence of a visit, they were immediately repulsed. On the 8th of November, Cataline audaciously appeared in the senate, when Cicero—who had received intelligence that the insurrection had already broken out in Etruria—commenced the celebrated invective beginning: *Quousque tandem abutêre, Catilina, patientia nostra?* &c. ("How long now, Catiline, will you abuse our patience?") The scoundrel was abashed, not by the keenness of Cicero's attack, but by the minute knowledge he displayed of the conspiracy. His attempt at a reply was miserable, and was drowned in cries of execration. With curses on his lips, he abruptly left the senate, and escaped from Rome during the night. Cataline and Manlius were now denounced as traitors, and an army under the consul, Antonius, was sent against them. The conspirators who remained in Rome, the chief of whom was Lentulus, were arrested, tried, condemned, and executed, December 5. The insurrections in several parts of Italy were meanwhile suppressed; many who had resorted to Cataline's camp in Etruria, deserted when they heard what had taken place in Rome, and his intention to proceed into Gaul was frustrated. In the beginning of January (62), he returned by Pistoria (now Pistoja) into Etruria, where he encountered the forces under Antonius, and, after a desperate battle, in which he displayed almost superhuman courage and enthusiasm, was defeated and slain. The appearance of Catiline was in harmony with his character. He had a daring and reckless look; his face was haggard with a sense of crime; his eyes were wild and bloodshot, and his step unsteady, from nightly debauchery. The history of the Catiline conspiracy is given by Sallust in a remarkably concise and nervous style.

CA'TION. See ANODE.

CA'TKIN (*amentum*), in Botany, a spike of numerous, small, unisexual flowers, destitute of calyx and corolla, and furnished with scale-like bracteæ instead, the whole inflorescence finally falling off by an articulation in a single piece. Examples are found in the willow, hazel, oak, birch, alder, and other trees and shrubs, forming the natural order AMENTACEÆ (q. v.). In some, as in the oak and hazel, the male flowers only are in catkins.

CA'TMINT (*Nepeta cataria*), a plant of the natural order *Labiatæ*, pretty common in England in chalky and gravelly soils, but rare in Scotland and Ireland, widely diffused throughout Europe and the middle latitudes of Asia and of North America; remarkable for the fondness which cats display for it. It appears to act upon them in a similar way to Valerian root; and when its leaves are bruised so as to be highly odoriferous, they are at once attracted to it, rub themselves on it, tear at it, and chew it. Its odor has been described as intermediate between that of mint and that of pennyroyal. It has erect stems, 2—3 feet high, dense whorls of many whitish flowers, tinged and spotted with rose color, and stalked heart-shaped leaves of a velvety softness, whitish and downy beneath.—Other species are numerous in the south of Europe and middle latitudes of Asia.

CA'TO, Marcus Porcius, surnamed *Censorius* and *Sapiens* ("the wise"), afterwards known as Cato Priscus or Cato Major—to distinguish him from Cato of Utica—was born at Tusculum in 234 B.C. He inherited from his plebeian father a small

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farm in the country of the Sabines, where he busied himself in agricultural operations, and learned to love the simple and severe manners of his Roman forefathers, which still lingered round his rural home. Induced by Lucius Valerius Flaccus to remove to Rome when that city was in a transition epoch, from the old-fashioned strictness and severe frugality of social habits, to the luxury and licentiousness of Grecian manners, C. appeared to protest against this, to denounce the degeneracy of the Philo-hellenic party, and to set a pattern of sterner and purer character. He soon distinguished himself as a pleader at the bar of justice, and after passing through minor offices, was elected consul. In his province of Nearer Spain, where an insurrection had broken out after the departure of the elder Scipio (206 B. C.), C. was so successful in quelling disturbances and restoring order, that in the following year he was honored by a triumph. C. exhibited extraordinary military genius in Spain; his stratagems were brilliant, his plans of battle were marked by great skill, and his general movements were rapid, bold, and unexpected. In 187 B.C., a fine opportunity occurred for the display of "antique Roman" notions. M. Fulvius Nobilior had just returned from Ætolia victorious, and sought the honor of a triumph. C. objected. Fulvius was indulgent to his soldiers, a man of literary tastes, &c., and C. charges him, among other enormities, with "keeping poets in his camp." These rude prejudices of C. were not acceptable to the senate, and C.'s opposition was fruitless. In 184 B.C., C. was elected censor, and discharged so rigorously the duties of his office, that the epithet *Censorius*, formerly applied to all persons in the same station, was made his permanent surname. Many of his acts were highly commendable. He repaired the water-courses, paved the reservoirs, cleansed the drains, raised the rents paid by the publicans for the farming of the taxes, and diminished the contract prices paid by the state to the undertakers of public works. More questionable reforms were those in regard to the price of slaves, dress, furniture, equipage, &c. His despotism in enforcing his *own* idea of decency may be illustrated from the fact, that he degraded Manilius, a man of prætorian rank, for having kissed his wife in his daughter's presence in open day. C. was a thoroughly dogmatic moralist, intolerant, stoical, but *great*, because he manfully contended with rapidly swelling evils; yet not *wise*, because he opposed the bad and the good in the innovations of his age with equal animosity.

In the year 175 B.C., C. was sent to Carthage to negotiate on the differences between the Carthaginians and the Numidian king Masinissa; but having been offended by the Carthaginians, he returned to Rome, where, ever afterwards, he described Carthage as the most formidable rival of the empire, and concluded all his addresses in the senate-house—whatever the immediate subject might be—with the well-known words: "*Ceterum censeo, Carthaginem esse delendam*" (For the rest, I vote that Carthage must be destroyed.)

Though C. was acquainted with the Greek language and its literature, his severe principles led him to denounce the latter as injurious to national morals. He died 149 B.C., at the age of 85. C. was twice married. In his eightieth year, his second wife, Salonia, bore him a son, the grandfather of Cato of Utica. C. treated his slaves with shocking harshness and cruelty. In his old age, he became greedy of gain, yet never once allowed his avarice to interfere with his honesty as a state-functionary. He also composed various literary works, such as "De Re Rustica" (a treatise on agriculture)—much corrupted, however. The best editions are by Gesner and Schneider in their "Scriptores Rei Rusticæ." His greatest historical work, "Origines," has unfortunately perished; but some few fragments are given in Kranse's "Historicorum Romanorum Fragmenta" (Berlin, 1838). Fragments of C.'s orations—of which as many as 150 were read by Cicero—are given in Meyer's "Oratorum Romanorum Fragmenta" (Zurich, 1842).

CATO, Marcus Porcius, named CATO THE YOUNGER, or CATO UTICENSIS (from the place of his death), was born 95 B.C. Having lost, during childhood, both parents, he was educated in the house of his uncle M. Livius Drusus, and, even in his boyhood, gave proofs of his decision and strength of character. In the year 72 B.C., he served with distinction in the campaign against Spartacus, but without finding satisfaction in military life, though he proved himself a good soldier. From Macedonia, where he was military tribune in 67, he went to Pergamus in search of the Stoic philosopher, Athenodorus, whom he brought back to his camp, and whom he induced to proceed with him to Rome, where he spent the time partly in philo-

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sophical studies, and partly in forensic discussions. Desirous of honestly qualifying himself for the quæstorship, he commenced to study all the financial questions connected with it. Immediately after his election, he introduced, in spite of violent opposition from those interested, a rigorous reform into the treasury offices. He quitted the quæstorship at the appointed time amid general applause. In 63 B.C., he was elected tribune, and also delivered his famous speech on the Catiline conspiracy, in which he denounced Cæsar as an accomplice of that political desperado, and determined the sentence of the senate. Strongly dreading the influence of unbridled greatness, and not discerning that an imperial genius—like that of Cæsar—was the only thing that could remedy the evils of that overgrown monster, the Roman Republic, he commenced a career of what seems to us blind pragmatical opposition to the three most powerful men in Rome—Crassus, Pompey, and Cæsar. C. was a noble but strait-laced *theorist*, who lacked the intuition into circumstances which belongs to men like Cæsar and Cromwell. His first opposition to Pompey was successful; but his opposition to Cæsar's consulate for the year 59 not only failed, but even served to hasten the formation of the first triumvirate between Cæsar, Pompey, and Crassus. He was afterwards forced to side with Pompey, who had resiled from his connection with Cæsar, and become reconciled to the aristocracy. After the battle of Pharsalia (48 B.C.), C. intended to join Pompey, but hearing the news of his death, escaped into Africa, where he was elected commander by the partisans of Pompey, but resigned the post in favor of Metellus Scipio, and undertook the defence of Utica. Here, when he had tidings of Cæsar's decisive victory over Scipio at Thapsus (April 6, 46 B.C.), C., finding that his troops were wholly intimidated, advised the Roman senators and knights to escape from Utica, and make terms with the victor, but prohibited all intercessions in his own favor. He resolved to die rather than surrender, and, after spending the night in reading Plato's "Phædo," committed suicide by stabbing himself in the breast.

CATO, Dionysius, is the name prefixed to a little volume of moral precepts in verse, which was a great favorite during the middle ages. Whether or not such a person ever existed, is a point of the greatest uncertainty. The title which the book itself commonly bears, is "Dionysii Catonis Disticha de Moribus ad Filium.' Its contents have been differently estimated: some scholars have considered the precepts admirable; others, weak and vapid: some have found indications of a superior scriptural knowledge; others, of a deep-rooted paganism. The style has been pronounced the purest Latin and the most corrupt jargon. The truth would seem to be, that on a groundwork of excellent Latin of the Silver Age, the illiterate monks of a latter period have, as it were, inwoven a multitude of their own barbaric errors, which preclude us from determining precisely the period when the volume was composed. It begins with a preface addressed by the supposed author to his son, after which come 56 injunctions of rather a simple character, such as "parentem ama." This is followed by the substance and main portion of the book—viz., 144 moral precepts, each of which is expressed in two dactylic hexameters. During the middle ages, the "Disticha" was used as a text-book for young scholars. In the 15th c., more than 30 editions were printed. The best edition, however, is that published at Amsterdam in 1754 by Otto Arntzenius. Caxton translated it into English.

CATODON and Catodo'ntidæ. See CACHOLOT.

CATOPTRICS. The divisions of the science of optics are laid out and explained in the article OPTICS (q. v.). C. is that subdivision of geometrical optics which treats of the phenomena of light incident upon the surfaces of bodies, and reflected therefrom. All bodies reflect more or less light, even those through which it is most readily transmissible; light falling on such media, for instance, at a certain angle is totally reflected. Rough surfaces scatter or disperse (see DISPERSION OF LIGHT) a large portion of what falls on them, through which it is that their peculiarities of figure, color, &c., are seen by eyes in a variety of positions; they are not said to *reflect* light, but there is no doubt they do, though in such a way, owing to their inequalities, as never to present the proper phenomena of reflection. The surfaces with which C. accordingly deals, are the smooth and polished. It tracks the course

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of *rays* and *pencils* of light after reflection from such surfaces, and determines the positions, and traces the forms, of images of objects as seen in mirrors of different kinds.

A ray of light is the smallest conceivable portion of a stream of light, and is represented by the line of its path, which is always a straight line. A pencil of light is an assemblage of rays constituting either a cylindrical or conical stream. A stream of light is called a converging pencil when the rays converge to the vertex of the cone, called a focus; and a diverging pencil, when they diverge from the vertex. The axis of the cone in each case, is called the axis of the pencil. When the stream consists of parallel rays, the pencil is called cylindrical, and the axis of the cylinder is the axis of the pencil. In nature, all pencils of light are primarily diverging—every point of a luminous body throwing off light in a conical stream; converging rays, however, are continually produced in optical instruments, and when light diverges from a very distant body, such as a fixed star, the rays from it falling on any small body, such as a reflector in a telescope, may, without error, be regarded as forming a cylindrical pencil. When a ray falls upon any surface, the angle which it makes with the normal to the surface at the point of incidence is called *the angle of incidence;* and that which the reflected ray makes with the normal, is called *the angle of reflection.*

Two facts of observation form the groundwork of catoptrics. They are expressed in what are called the laws of reflection of light: 1. In the reflection of light, the incident ray, the normal to the surface at the point of incidence, and the reflected ray, lie all in one plane. 2. The angle of reflection is equal to the angle of incidence. These laws are simple facts of observation and experiment, and they are easily verified experimentally. Rays of all colors and qualities follow these laws, so that white light, after reflection, remains undecomposed. The laws, too, hold, whatever be the nature, geometrically, of the surface. If the surface be a plane, the normal is the perpendicular to the plane at the point of incidence; if it be curved, then the normal is the perpendicular to the tangent plane at that point. From these laws and geometrical considerations may be deduced all the propositions of catoptrics. In the present work, only those can be noticed whose truth can in a manner be exhibited to the eye, without any rigid mathematical proof. They are arranged under the heads *Plane Surfaces* and *Curve Surfaces.*

Plane Surfaces.—1. When a pencil of parallel rays falls upon a plane mirror, the reflected pencil consists of parallel rays. A glance at the annexed figure (fig. 1), where PA and QB are two of the incident rays, and are reflected in the directions AR and BS respectively, will make the truth of this pretty clear to the eye. The proposition, however, may be rigidly demonstrated by aid of Euclid, book xi., with which, however, we shall not presume the reader to be acquainted. The reader may satisfy himself of its truth practically by taking a number of rods parallel to one another and inclined to the floor, and then turning them over till they shall again be equally inclined to the floor, when he will again find them all parallel.

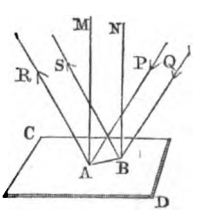

Fig 1.

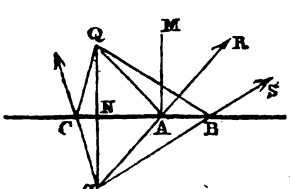

Fig 2.

—2. If a diverging or converging pencil is incident on a plane mirror, the focus of the reflected pencil is situated on the opposite side of the mirror to that of the incident pencil, and at an equal distance from it. Suppose the pencil to be diverging from the focus Q (fig. 2), on the mirror of the surface of which CB is a section. Draw QN*q* perpendicular to CB, and make *q*N=QN, then *q* is the focus of the reflected rays. For let QA, QB, QC be any of the incident

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rays in the plane of the figure; draw the line AM perpendicular to CB, and draw AR, making the angle MAR equal to the angle of incidence, MAQ. Then AR is the reflected ray. Join qA. Now it can be proved geometrically, and indeed is apparent at a glance, that qA and AR are in the same straight line; in other words, the reflected ray AR proceeds as if from q. In the same way, it may be shewn that the direction of any other reflected ray, as BS, is as if it proceeded from q; in other words, q is the focus of reflected rays; it is, however, only their *virtual* focus. See Focus. If a pencil of rays converged to q, it is evident that they would be reflected to Q as their real focus, so that a separate proof for the case of a converging pencil is unnecessary. The reader who has followed the above, will have no difficulty in understanding how the position and form of the image of an object placed before a plane mirror—as in fig. 3, where the object is the arrow AB, in the plane of the paper, to which the plane of the mirror is perpendicular—should be of the same form and magnitude as the object (as ab in the fig.), and at an equal distance from the mirror, on the opposite side of it, but with its different parts inverted with regard to a given direction. The highest point a, for instance, in the image corresponds with the lowest point, A, in the object. He will also understand how, in the ordinary use of a looking-glass, the right hand of the image corresponds to the left hand of the object.

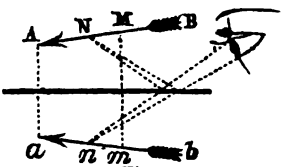

Fig 3.

When two plane mirrors are placed with their reflecting surfaces towards each other, and parallel, they form the experiment called the Endless Gallery. Let (in fig. 4) the arrow Q, be placed vertically between the parallel mirrors, CD, BA, with

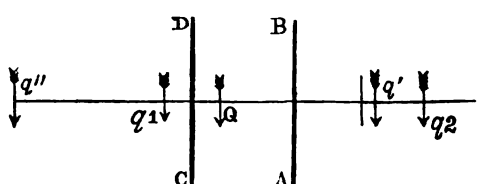

Fig 4.

their silvered faces turned to one another, Q will produce in the mirror CD the image q^1. This image will act as a new object to produce with the mirror BA the image q^2, which, again, will produce with the mirror CD another image, and so on. Another series of images, such as q', q'', &c., will similarly be produced at the same time, the first of the series being q', the image of Q in the mirror BA. By an eye placed between the mirrors, the succession of images will be seen as described; and if the mirrors were perfectly plane and parallel, and reflected all the light incident on them, the number of the images of both series would be infinite. If, instead of being parallel, the mirrors are inclined at an angle, the form and position of the image of an object may be found in precisely the same way as in the former case, the image formed with the first mirror being regarded as a new (virtual) object, whose image with regard to the second has to be determined. For a curious application of two plane mirrors meeting and inclined at an angle an aliquot part of 180°, see art. KALEIDOSCOPE—3. The two propositions already established are of extensive application, as has partly been shewn. They

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include the explanation of all phenomena of light related to plane mirrors. The third proposition is one also of considerable utility, though not fundamental. It is: When a ray of light has been reflected at each of two mirrors inclined at a given angle to each other, in a plane perpendicular to their intersection, the reflected ray will deviate from its original course by an angle double the angle of inclination of the mirrors. Let A and B (fig 5) be sections of the mirrors in a plane perpendicular to their intersection, and let their directions be produced till they meet in C. Let SA, in the plane of A and B, be the ray incident on the first mirror at A, and let AB be the line in which it is thence reflected to B. After reflection at B, it will pass in the line BD, meeting SA, its original path produced in D. The angle ADB evidently measures its deviation from its original course, and this angle is readily shewn to be double of the angle at C, which is that of the inclination of the mirrors. It is on this proposition that the important mathematical instruments called the Quadrant and Sextant (q. v.) depend.

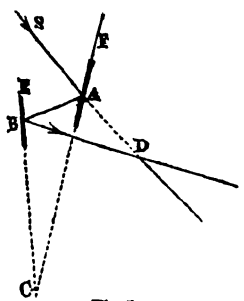

Fig 5.

Curved Surfaces.—As when a pencil of light is reflected by a curved mirror, each ray follows the ordinary law of reflection, in every case in which we can draw the normals for the different points of the surface, we can determine the direction in which the various rays of the pencil are reflected, as in the case of plane mirrors. It so happens that normals can be easily drawn only in the case of the sphere, and of a few "surfaces of revolution," as they are called. These are the paraboloid, the ellipsoid, and the hyperboloid of revolution. The paraboloid of revolution is of importance in optics, as it is used in some specula for telescopes. See arts. SPECULUM and TELESCOPE. The three surfaces last named are, however, all of them interesting, as being for pencils of light incident in certain ways what are called surfaces of accurate reflection—i. e., they reflect all the rays of the incident pencil to a single point or focus. We shall explain to what this property is owing in the case of the parabolic reflector, and state generally the facts regarding the other two.

1. The concave parabolic reflector is a surface of accurate reflection for pencils of rays parallel to the axis or central line of figure of the paraboloid. This results from the property of the surface, that the normal at any point of it passes through the axis, and bisects the angle between a line through that point, parallel to the axis, and a line joining the point to the focus of the generating parabola. Referring to fig. 6, suppose a ray incident on the surface at P, in the line SP, parallel to the axis AFG. Then if F be the focus of the generating parabola, join PF. PF is the direction of the reflected ray. For PG, the normal at P, by the property of the surface, bisects the angle FPS, and therefore ∠ (angle) FPG = ∠GPS. But SPG is the angle of incidence, and SP, PG, and FP are in one plane, and therefore, by the laws of reflection, FP is the reflected ray. In the same way, all rays whatever parallel to the axis, must pass through F after reflection. If F were a luminous point, the rays from it, after reflection on the mirror, would all proceed in a cylindrical pencil parallel to the axis. This reflector, with a bright light in its focus, is accordingly of common use in light-houses.

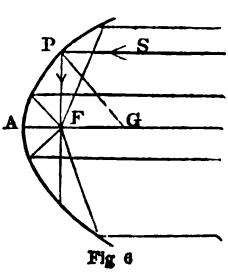

Fig 6

2. In the concave ellipsoid mirror there are two points—viz., the foci of the generating ellipse, such that rays diverging from either will be accurately reflected to the other. This results from the property of the figure, that the normal at any point bisects the angle included between lines drawn to that point from the foci.

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8. Owing to a property of the surface similar to that of the ellipsoid, a pencil of rays converging to the exterior focus of a hyperbolic reflector, will be accurately reflected to the focus of the generating hyperbola.

The converse of the above three propositions holds in the case of the mirrors being convex.

Though the sphere is not a surface of accurate reflection, except for rays diverging from the centre, and which on reflection are returned thereto, the spherical reflector is of great practical importance, because it can be made with greater facility and at less expense than the parabolic reflector. See art. TELESCOPE. It is necessary, then, to investigate the phenomena of light reflected from it.

Spherical Mirrors.—It is usual to treat of two cases, the one the more frequent in practice, the other the more general and comprehensive in theory. First, then, to find the focus of reflected rays when a small pencil of parallel rays is incident directly on a concave spherical mirror. Let BAB' (fig. 7) be a section of the mirror, O its centre of curvature, and A the centre of its aperture. AO is the axis of the mirror, and therefore of the incident pencil, because it is incident directly on the mirror; a pencil being called oblique when its axis is at an angle to the axis of the mirror. As the ray incident in the line OA will be reflected back in the same line—OA being the normal at A—the focus of reflected rays must be in OA. Let SP be one of the rays; it will be reflected so that ∠ *q*PO = ∠ SPO. But ∠ PO*q* = ∠ OPS by parallel lines. Therefore, ∠ *q*PO = ∠ *q*OP, and P*q* and O*q* are equal. If, now, the incident pencil be very small—i. e., if P be very near A—then the line P*q* will very nearly coincide with the line OA, and P*q* and O*q* will each of them become very nearly the half of OA. Let F be the middle point of OA—the point, namely, to which *q* tends as the pencil diminishes. Then F is called the principal focus of the mirror, and AF the principal focal length, which is thus = ½ radius of the mirror. It will be observed that when AP is not small, *q* lies between A and F. F*q* is called the aberration of the ray. When AP is large, the reflected rays will continually intersect, and form a luminous curve with a cusp at F. This curve is called the caustic (q. v.). We shall now proceed to the more general case of a small pencil of diverging rays, incident directly on a concave spherical mirror. Let PAP' (fig. 8) be a section of the mirror, A the centre of its aperture, O of its curvature, and let F be its principal focus. Then, if Q be the focus of incident rays (as if proceeding from a candle there situated), *q*, the focus of the reflected rays, lies on QOA, since the pencil is incident directly, and the ray QOA, being incident in the line of the normal OA, is reflected back in the same line. Let PQ be any other ray of the pencil. It will be reflected in P*q*, so that ∠ *q*PO = ∠ OPQ; and on the supposition that PA is very small, so that QP becomes nearly equal to QA, and *q*P to *q*A, it can be shewn by Euclid, vi. 8, that $\frac{QO}{QA} = \frac{qO}{qA}$ very nearly. From this equation is deduced the formula $qA = \frac{QA \times AF}{QA - AF}$, which enables us to find *q*A, when QA and AF are known. Thus, let the radius of curvature be 12 inches, and the distance of the source of the rays, or QA, 80 inches, the focal length $qA = \frac{80 \times 6}{80 - 6} = 7\frac{1}{37}$ inches. If the rays had diverged from *q*, it is clear they

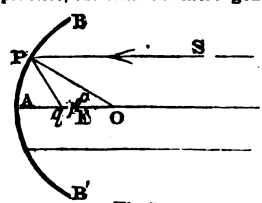

Fig 7.

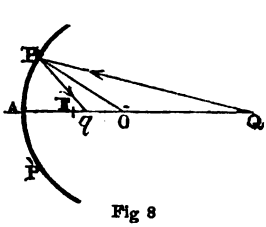

Fig 8

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would have been reflected to Q. The points Q and q, accordingly, are called conjugate foci.

If the mirror be convex, as in fig. 9, instead of concave, and a pencil of diverging rays be incident directly on it from Q, we should find, proceeding in exactly the same way as in the former case, the equation $qA = \frac{QA \times AF}{QA \times AF}$; or taking the same numbers as before; $qA = \frac{30 \times 6}{30 + 6} = 5$ inches.

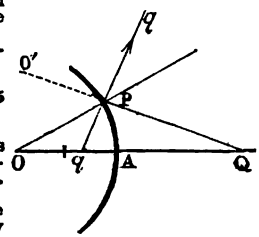

Fig 9.

For information regarding the formation of images by spherical mirrors, the reader may consult Potter's "Elements of Optics." See also the arts. MIRRORS and IMAGES.

By considering fig. 8, it is easy to see how the relative positions of the two *conjugate* foci, as they are called, Q and q, vary as the distance, AQ, of the origin of the rays is changed. As Q is advanced towards O, q also approaches O, since the angles QPO and qPO always remain equal; and when the source of the light is in the centre, O, of the sphere, the reflected rays are all returned upon the source. As Q, again, recedes from O, q moves towards F, which it does not quite reach until the distance of Q is infinite, so that the incident rays may be considered as parallel, as in fig. 7. If Q is placed between O and F, then q will be to the right of O; and when Q coincides with F, the reflected rays will have no focus, but will be parallel. If Q is between F and A, the reflected rays will diverge, and will have their virtual focus to the left of A. The correctness of these deductions may easily be verified. The positions of the conjugates are traced in precisely the same way for the convex mirror, and the reader who is interested will find no difficulty in tracing them for himself.

CATOPTROMANCY, divination by the mirror or looking-glass. At Patras, in Greece, the sick foretold their death or recovery by means of a mirror let down with a thread until its base touched the water in a fountain before the temple of Ceres. The face of the sick person appearing healthy in the mirror, betokened recovery; if it looked ghastly, then death was sure to ensue. More modern superstitions attach ill-luck to the breaking of a looking-glass, and to seeing one's face in a glass by candle-light.

CATS, Jacob, a Dutch statesman and poet, was born at Brouwershaven, in Zeeland, in 1577, and after studying law, finally settled at Middelburg. He rose to high offices in the state; and was twice sent as ambassador to England, first in 1627, and again in 1652, while Cromwell was at the head of affairs. He died 1660. As a poet he enjoyed the highest popularity. His poems are characterised by simplicity, rich fancy, clearness, and purity of style, and excellent moral tendency. The most highly prized of his productions were the "Huwelyk," "Trouwringh" (a series of romantic stories relating to remarkable marriages), and the "Spiegel van den Ouden en Nieuwen Tyd." The best edition of his works appeared at Amsterdam, in 19 vols., 1790—1800.

CAT'S-EYE, a beautiful mineral, a variety of quartz receiving its name from the resemblance which the reflection of light from it, especially when cut *en cabochon*, or in a convex form, is supposed to exhibit to the light which seems to emanate from the interior of the eye of a cat. It has a sort of pearly appearance, and is *chatoyant* or characterised by a fine play of light, which results from the parallel arrangement of the minute fibres of the stone itself, or from an intimate mixture of some foreign substance, such as amianthus. It has been supposed that C. is silicified wood. It is of various colors, and is obtained chiefly from Malabar and Ceylon. The Singhalese are especially proud of it, believing it, although erroneously, to be only found in their island. It is often brought from that island, cut to resemble a monkey's face, from the idolatrous regard entertained for the monkey. A chatoy-

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ant variety of felspar has been sometimes confounded with C., and is also found in Ceylon.

CA'TSKILL MOUNTAINS, a group of the Alleghany chain, in its largest sense, situated near the right bank at once of the Hudson and of the Mohawk, in the state of New York. The loftiest points, Round Top and High Peak, are respectively 3800 feet and 3720 above tide-water; and, on a third eminence, a terrace of 2500 feet above the same level presents Catskill Mountain House, a favorite retreat in summer. The group is drained chiefly by Catskill Creek, which, at a village of its own name enters the Hudson 111 miles above its mouth, and 34 below the confluence of the Mohawk.

CA'T'S-TAIL. See TYPHA.

CA'T'S-TAIL GRASS. See TIMOTHY GRASS.

CA'TTARO, a town of Austria, in the crown-land of Dalmatia, is situated at the head of the Gulf of Cattaro, about 36 miles south-east of Ragusa. It is strongly fortified, and surrounded on all sides by mountains. The castle, a massive and almost inaccessible building, stands on a precipitous rock immediately behind the town. C. has a cathedral, several churches and hospitals, and a population of 3000. C., which was at one time the capital of a small republic, was in 1807 annexed to the kingdom of Italy, but was handed over to Austria in 1814 by the treaty of Vienna.—CATTARO, GULF OF, or BOCCA DI CATTARO, an inlet of the Adriatic, near the south extremity of the Dalmatian coast. It consists of three basins or lakes, connected by straits of about half a mile in breadth. The outer entrance is only a mile and a half wide, and the total length of the gulf is about 30 miles. Mountains protect it from all winds, and it has a depth of from 15 to 20 fathoms.

CA'TTEGAT, or Kattegat (*Sinus Codanus*), the bay or arm of the sea situated between the east coast of Jütland and the west coast of Sweden, to the north of the Danish islands. It is connected with the Baltic Sea by the Great and Little Belt (q. v.), and by the Sound. The Skager Rack (q. v.) connects it with the North Sea. The length of the C. is about 150 miles, and its greatest breadth 85 miles. It is of unequal depth, and has dangerous sand-banks. The principal islands are Lasöe, Samsöe, and Anhalt. The Danish shores of the C. are low, but the Swedish shore is very steep and rocky.

CA'TTERMOLE, George, one of the most distinguished of English painters in water colors, was born at Dickleburgh, Norfolk, in 1800. His pictures, which embrace a wide range of subjects, are remarkable for their striking originality of conception, vigorous execution, and fine color and tone. One of his best known and greatest pictures is "Luther at the Diet of Spires," containing 33 portraits of the principal characters, copied from the authentic originals by the old masters. He also designed the engravings for his brother's "History of the Civil wars," and illustrated many scenes in Scott's novels and in Shakspeare. His later works are chiefly oil-paintings. He died July 24, 1868.

CA'TTI, or Chatti, a German people, included by Cæsar under the name Suevi (q. v.), who inhabited a country pretty nearly corresponding to the present Hesse. The south-western part of their territory, around *Mattiacum*, was conquered by the Romans under Drusus. The C. took part in the general rising of the Germans under Hermann. Tacitus praises them as excellent foot-soldiers. During the reign of Marcus Aurelius, in the end of the 2d c., they made incursions into Roman Germany and Rhætia. Caracalla failed in an expedition against them and the Alemanni in the 3d century. About the middle of that century, their name began to give place to that of the Franks (q. v.), and is last mentioned by Claudian in the latter part of the 4th century.

CA'TTLE. See Ox.

CATTLE, in English Law. See CHATTELS.

CATTLE-PLAGUE, Rinderpest (Ger.), or Steppe Murrain, is a contagious eruptive fever, or exanthema, of the bovine species; sheep, goats, deer, and other allied species occasionally, however, catch it from cattle. It occurs indigenously on the plains of Western Russia, whence it has at various times overspread most parts of the Old World. The specific virus from diseased or infected animals is the only

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source of cattle-plague; no filth, overcrowding, or other health-depressing cause has hitherto produced it. As in smallpox, scarlatina, and other eruptive fevers, an incubative stage, varying between two and twenty days, intervenes between the introduction of the virus into the system, either by inoculation or contagion, and the development of the characteristic symptoms. These consist essentially of congestion of the mucous and cutaneous surfaces, with a sort of aphthous eruption, and thickening, softening, and desquamation of the superficial investing membrane. The disease runs a tolerably fixed and definite course, which is not materially altered by any known remedial measures. It seldom attacks the same individual a second time.

History.—The cattle-plague has been recognized for upwards of a thousand years. It appears to have destroyed the herds of the warlike tribes who overran the Roman Empire during the 4th and 5th centuries. About 810 it travelled with the armies of Charlemagne into France, and about the same period is also supposed to have visited England. Several times throughout the course of every century it spread from the plains of Russia over the western countries of Europe, and is stated to have again visited England about 1225. Although occasioning every few years great losses on the continent of Europe, the plague does not appear to have again shewn itself in England until 1714, when it appeared at Islington about the middle of July, was very destructive for about three months, but was again got rid of towards Christmas. In 1744 it was in Holland, destroying there in two years 200,000 cattle; in Denmark, from 1745—1749, it killed 280,000; in some provinces of Sweden it spared only 2 per cent. of the horned cattle. It made terrible havoc throughout Italy, destroying 400,000 beasts in Piedmont alone. In April 1745, the plague was again imported into England, probably by some white calves from Holland, where, as already stated, it had for some time prevailed. It continued its devastations for twelve years, but it is now impossible accurately to discover the losses it occasioned. In the third and fourth years of its ravages 80,000 cattle were slaughtered, and double that number are supposed to have died. In 1747, 40,000 cattle died in Nottingham and Lancashire alone; whilst, so late as 1757, 30,000 perished in Cheshire in six months. In March, 1770, the disease was brought with some hay from Holland to Portsoy, in the Moray Firth; several cattle died, and others, to the value of £799, 12s. 2d., being destroyed, the further spread of the pest was prevented. By the wars which wasted Europe towards the close of the last and first eighteen years of the present century, cattle-plague was spread widely over the continent, and occasioned, wherever it occurred, terrible losses. Since then, at short intervals, it has spread—always being traceable to its source on the Russian plains—over Poland, Hungary, Austria, Prussia, portions of Germany and Italy, and has extended to Egypt. It has also reached China and Japan.

The British outbreak of 1865—1867, like its predecessors, undoubtedly came from Russia. The steamer *Tonning* from Revel, brought 331 cattle and 330 sheep into Hull on 29th May 1865. A portion of the cattle had come from the interior of Russia, where the plague then was, or recently had been; the cargo was rapidly landed, and very hurriedly inspected. Nearly half of the cattle were distributed in various lots to butchers in Leeds, Derby, and Manchester, but, curiously, these do not appear to have left any contagion in their trail. One hundred and seventy-five came to London, remained from the Monday evening until Thursday's market in lairs at York Road, adjoining the cattle-market. It was stated, in a leader in the "Times" of 15th August, that rinderpest was seen in the metropolitan market as early as 12th June. Certain it is that more than one lot purchased on 19th June carried the disease to several dairies in and about London. The first cases were mistaken for cases of poisoning, the cows they had stood beside were sent into market, and thus the subtile disorder in a few weeks spread into many dairies both in town and country. Twenty-three Dutch cattle, having stood over for several markets, were sent back to Holland on 2d July, carried with them the contagion, were placed in a field near Schiedam, but soon sickened and died, thus spreading the disease in Holland. During the next six months, plague was repeatedly reimported thence into England. Until 11th August 1865, no restrictions whatever were put upon the removal of cattle; diseased and infected animals were freely taken to fairs and markets, were openly travelled by road and rail; whilst the metropolitan market continued every week to send forth infected cases, not only to the neighboring counties, but to

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Southampton, Birmingham, Hereford, Liverpool, Edinburgh, and even to Aberdeenshire. As early as 18th July, the pest was brought from London to Huntly by four calves; subsequent outbreaks occurred in the same way. The stamping-out system was, however, early and rigidly enforced in Aberdeenshire, and eight distinct outbreaks were promptly got rid of.

In Edinburgh, it appeared probably about 9th August, was brought from London by some low-priced foreign cows; in six weeks, about 800, or one half the dairy cows in Edinburgh, had died—200 having been buried in one trench. By the end of January, four-fifths of the dairy cows had perished, but Edinburgh was reported clear. In Glasgow, the first case occurred on 19th August, in a cow sent from Edinburgh. By 30th September, 432 cases were reported, and it continued to spread. By the middle of October, it was in Mr Harvey's valuable stock of 800, of which 25 died in one night, and to save further loss, 50 healthy animals were in one day disposed of to the butcher. From Falkirk Trysts, as from Barnet, Norwich Hill, and other large English fairs, the disease was transmitted into fresh localities. From the autumn trysts, it was carried into Perthshire, Forfarshire, and Fifeshire. Diseased cattle passing along in railway trucks, appear to have spread the contagion over the fields adjoining the line at Thornton, Fifeshire. Into West Lothian it was conveyed early in September by lambs from the Edinburgh market.

The rapid spread of the insidious disorder may be gathered from the fact that, whilst, during the week ending 24th June 1865, there was only one outbreak at Mrs Nicholl's dairy at Islington, and 30 animals affected, by 30th September there were 1702 farms, sheds, or other places in which the pest had appeared, and 13,268 animals had been attacked. Three months later, 8252 separate places had been visited, and 62,748 animals attacked. During six months, the aggregate of cattle attacked was 76,009. During the three months to 30th March, 13,448 farms and other premises had been infected, and 147,275 cattle attacked. In December 1865, the fresh cases each week reached 9000; but in spite of remedial and preventive measures, of orders in council, and restrictions on the movement of stock, the number of weekly cases steadily increased to 15,706 in the third week of February. "The Cattle Diseases Prevention Act" passed 20th February 1866, and the advantages flowing from the restrictions thus tardily imposed on the trade in cattle, and the slaughter of diseased and infected animals, were speedily apparent. In four weeks, the number of cases was reduced by one half. During the three months ending 30th June, 28,276 cases were reported; during the next three months to 30th September, the numbers fell to 2108; whilst, to 29th December, the three months' cases were but 149; to 30th March 1867, 89 new cases were noted. Throughout April and May the number of cases continued steadily to decline; but during the week ending 26th May a fresh outbreak occurred in the Finsbury district of the metropolis, and 81 animals died, or were slaughtered to prevent the further spread of the pest. With the exception of an isolated outbreak in Essex, which was promptly stayed by slaughter of the ailing and suspected animals, the country was free of plague during August. The following are the records of its destructive career during 1865—1867.

	Attacked.	Killed.	Died.	Recovered.
England.....	223,672	102,740	90,450	21,589
Wales.....	8,388	1,180	5,794	1,117
Scotland.....	46,863	6,263	28,088	10,707
Total,	278,923	110,183	124,332	33,413

To this sad total must be added 11,000 cases known to have been attacked and unaccounted for, and upwards of 60,000 healthy cattle slaughtered to prevent the spread of the disease. Plague was again imported into Hull in August 1872; it was brought with cattle from Cronstadt; it spread into several districts of the East Riding, attacked 72 animals, 51 of which were killed, and 21 died; whilst, to arrest the outbreak, 171 animals which had been in contact with diseased subjects were slaughtered.

Causes.—The development of cattle-plague by filth, overcrowding, miasmata, hot weather, or other such causes, is untenable. Faulty hygiene, by lowering vitality, probably renders the animal more prone to the attack, and less able to bear up against it, but it cannot originate plague. Like hydrophobia, smallpox, or syphilis,

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it is developed only by the special virus, which appears to have its habitat on the Russian steppes. This virus occurs abundantly in the blood of every plague-stricken beast, in the discharges from its nostrils, mouth, or eyes, in the off-scourings from the bowels, probably even in the breath. It may be transferred to healthy beasts by inoculation. A little of the blood or nasal or other mucous discharges of a plague case, if introduced underneath the skin of a healthy cow, develops the disease within a few days. The transference of the virus or contagion from the sick to the sound animal, is not always so direct and evident. As with other catching diseases, the virus may be carried considerable distances in the air, its particles are minute, but they have powerful vitality; it may adhere to the food that has lain before infected beasts; to the litter from the stalls, or even after it has been heaped for weeks; to the clothes of attendants; to the floors, walls, or stalling of buildings; to imperfectly cleansed cattle-trucks. So subtle and potent is the plague poison, and so endowed with the power of self-multiplication and growth, that a very minute portion of it finding access to the blood of a healthy animal of the bovine race increases so rapidly, that to use the words of the Commissioners' Report, No. III, p. 4, "the whole mass of the blood, weighing many pounds, is infected; and every small particle of that blood contains enough poison to give the disease to another animal." It may gain access to the blood probably through the air-passages, perhaps also by absorption through the mucous surface of the bowels, or even through the skin.

Symptoms—In from three to six days after an animal has been exposed to the virus of cattle-plague, or about 36 to 48 hours after being purposely inoculated, the temperature of the body is raised by several degrees. A delicate thermometer introduced into the vagina or rectum, instead of marking about 102° F., indicates 104° to 106°. As yet, the appetite, secretion of milk, breathing, and pulse are scarcely if at all affected, and but for the elevation of temperature, accompanied sometimes by dullness, the animal might be supposed to be in the best of health. Two or three days later, or usually within six or eight days after the beast has taken in the subtile virus, the mucous membrane of the mouth is generally observed to be slightly reddened, and soon a granular yellowish-eruption, consisting of thickened epithelium cells and granules, appears on the gums round the incisor teeth, and by and by on the lips and dental pad. Some hours later, the same eruption extends to the cheeks, tongue, and hard palate. Within 48 hours, or about the sixth day of attack, a crust of epithelium covers the gums, lips, and mouth, and when wiped away, or accidentally rubbed off, leaves the abraded membrane red and vascular, and exhibiting patches of erosion. The membrane lining the vagina indicates very similar appearances; it is reddened and vascular, dotted with grayish translucent elevations about the size of rape-seeds, covered with a whitish-yellow, usually sticky discharge, and occasionally marked with patches of excoriation. The skin, like the mucous surfaces, is congested; there is hence a perverted development of scarf skin, and of the oleaginous secretions of the irritated sebaceous glands. The skin is thus invested with a furfuraceous desquamation; whilst on its thinner portions about the lips, between the thighs, and on the udder, there are papular eruptions or elevations. About two, or even three days after the temperature has been increased, and usually one, or even two days after the appearance of the characteristic eruption on the gums, the constitutional symptoms present themselves. The animal is dull, hangs its head, arches its back, the eyes are leaden and watery, and from both eyes and nose there latterly comes a dirty slimy discharge. Appetite and rumination are irregular, and in dairy cows the secretion of milk rapidly abates. The breathing, especially towards the sixth day, is oppressed, expiration is prolonged, and accompanied by a peculiar grunt. The pulse is small and thready, and quickened as death approaches. The bowels, usually at first confined, become, towards the sixth or seventh day, much relaxed; the discharges passed, often with pain and straining, are profuse and liquid, offensive, acrid, pale colored, and occasionally mixed with blood. The patient loses weight and strength, totters if it attempt to walk, and prefers to lie rather than to stand. Death usually occurs about the seventh day, and is preceded by muscular twitchings, a peculiar sickly, often offensive smell, a cold, clammy state of body, moaning, grinding of the teeth, and rapidly increasing prostration.

Prognosis.—Cases usually terminate unfavorably when about the fifth or sixth

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day the animal temperature falls rapidly; the pulse becomes small, quick, and weak; the breathing more difficult, distressed and moaning; the diarrhœa increased, and the depression more notable. A more favorable termination may be anticipated when, after the fifth day, the heightened temperature, so notable even from the earliest stages, abates gradually; the breathing becomes easier; the pulse firmer; the visible mucous membranes appear healthier; and patches of extravasation, or erosion speedily disappear.

Sheep do not take rinderpest spontaneously, and even when kept with diseased cattle, or inoculated with cattle-plague virus, they do not catch the disease so certainly as cattle do. When diseased, they exhibit, however, very similar symptoms, but Professor Röll, and other observers, record that upwards of 40 per cent. recover. Goats, deer, antelopes, gazelles, yaks, and indeed all animals taking rinderpest, exhibit with tolerable uniformity the same characteristic symptoms.

Post-mortem Appearance.—The mucous membranes are generally deeper colored than natural, are congested, softened, marked in places with the same granular patches discoverable during life within the mouth and the vagina, and in bad cases exhibit œdema, hæmorrhage, and sloughing. The first three stomachs sometimes contain a good deal of food, but shew less declension from health than the fourth stomach, of which the mucous membrane is dotted with spots of congestion and extravasation. The coats of the bowels are thinned and easily torn. The mucous coat, especially towards the middle of the small intestines, the opening into the cæcum, and posterior half of rectum, is much congested, bared of epithelium, and sometimes ecchymosed, but never ulcerated. Peyer's glands, so generally inflamed in the somewhat analogous typhoid fever of man, are perfectly healthy. The liver, spleen, and pancreas seldom present any special appearances. The respiratory mucous membrane, like the digestive, is vascular, and marked with submucous hemorrhage; the lungs are generally emphysematous, the heart often marked with petechial spots. The urino-genital, like the other mucous membranes, is congested in females, especially towards the lower part of the vagina and vulva; the kidneys are sometimes rather softened; the serous membranes and nervous centres are perfectly unchanged. Dr. Beale, by his microscopical observations, discovers in the capillaries a great increase of nuclear or germinal matter, and white blood-corpuscles, which he believes may account for the local congestion. The blood itself is dark in color; in the later stages it contains less water, probably owing to the draining diarrhœa, and about double its usual proportion of fibrine. The muscular tissues are softened, easily broken down, and contain an abnormal amount of soluble albumen. The urine is little altered in quantity, but from the first rise in the animal temperature, it contains an increase of urea varying from 5 to 15 per cent. The chief change in the milk is its rapid diminution in quantity, and the increase of its fatty matters. The bile is watery, offensive, and prone to decomposition.

Treatment.—Cattle-plague is proved to be an eruptive fever. When the specific poison, on which such disorders depend, has entered the body of a susceptible subject, no remedy has yet been discovered which can destroy it, or even materially shorten or mitigate its effects. Until such an antidote is found, there can be no hope of certain cure. The Cattle plague Commissioners have collected information regarding the four following methods of treatment—namely, the antiphlogistic, the tonic and stimulant, the antiseptic, and the special. Diverse as are these systems, the percentages of recoveries, varying from 25·83 to 27·45, were so nearly alike, that it is fair to conclude that no one of the systems tried exercised any notable influence in checking the mortality. Partly, perhaps, from the varying virulence of the plague, partly from differences in the nursing and care bestowed on the animals, the proportion of recoveries has varied greatly in different localities. Up to the end of 1865, in Huntingdon they were only 4·668 per cent.; in Norfolk they were 12·102; in Flint, 15·909; in Scotland, 19·889; whilst in Fifeshire they reached 24·352; and in Yorkshire, 29·731 per cent.

Like small-pox, measles, and other eruptive fevers in man, rinderpest runs a definite course which cannot safely be interfered with. Rational treatment is therefore limited to warding off untoward symptoms, to careful nursing, and husbanding the falling strength. It must, however, be remembered that throughout the progress of the disease there is constantly given off from the sick body minute par-

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ticles, which are capable of developing the disorder in healthy cattle. Hence plague-subjects, by the orders in council, are very properly desired to be immediately destroyed. Except, therefore, for purely scientific purposes, and with careful precautions to prevent the spread of the poison, it is unwise to attempt remedial treatment. Where, however, a beast is to have a chance of recovery, so soon as the elevated temperature indicates the accession of the disease, solid indigestible food should be withheld, and the patient restricted to mashes, gruel, boiled linseed, malt, and other food, which can be digested without the necessity for rumination. The paramount importance of such a dietary is clearly demonstraied in the returns of the Edinburgh Cattle-Plague Committee to the government commissioners. The recoveries amongst 310 cattle "fed with dry food, and treated medicinally with drugs," were 13·6. Amongst 303 cattle treated with mixed food and hay, 22·2 recovered. Where mashes were given during sickness, but dry food supplied during convalescence, the recoveries reached 51·5 whilst in 96 cottagers' cows, whose chief ordinary dietary consisted of mashed food, and which were fed in the same manner throughout both sickness and convalescence, and were besides carefully nursed but not doctored, the recoveries reached 73·7. Where the bowels, at the onset are costive, a dose of oil, or a very small quantity of some saline purgative, may be required. Cold water, gruel, mashes, or stale bread soaked either in water or beer, should be offered at short intervals throughout the attack. The animal, kept in an atmosphere of about 60°, should be comfortably clothed, and have its legs bandaged. The hot-air bath and wet-packing has been repeatedly tried, but although probably useful in the earlier stages, appear, when the disease is fully established, to harass and weaken the patient. Small and repeated doses of sulphite of soda have in some cases proved useful, and may be conjoined with carefully regulated moderate doses of such stimulants as ale, whisky and water, sweet spirit of nitre, spirit of ammonia, or strong coffee. It is most important, however, that these and other such medicines should be drunk by the animal of its own accord in its gruel, water, or mashes, as the forcible horning over of drenches always disturbs the patient. The inhalation of chloroform, although temporarily relieving the distressed breathing, does not appear to exert any permanent benefit.

Prevention.—From what has been stated regarding the nature of cattle plague, it must be evident that its prevention can only be effected by the destruction of the specific virus, or by removing beyond its influence all animals on which it might fasten. Sparks fall harmless where no inflammable materials lie within reach, and there are many such materials. Neither should sheep, fresh hides, hay, nor any other fodder and litter from countries where this ruinous plague exists, or has recently visited, be allowed to enter British ports. This very obvious precaution took strong hold of the public mind, and the practical result is, that importations of cattle plague are guarded against by the provisions of the Contagious Diseases (Animals) Act, 1869. Neither cattle, sheep, nor pigs, fodder or litter, hides or skins, can be landed from countries where the plague exists, or from places in direct communication with such infected countries. All foreign stock is inspected at the ports of debarkation, and inspectors have orders for the immediate slaughter and disinfection of cattle-plague subjects, and of any animals with which they have been in contact. But even with such precautions, foreign cattle frequently bring with them catching disorders, notably foot-and-mouth disease. Since they constitute, however, less than 5 per cent. of the total cattle stock of the country, such risks should be removed by converting the foreign cattle traffic into a dead-meat trade.

Rinderpest being found to resemble smallpox in men and sheep, it was thought that its propagation and virulence might be abated by vacciuation with cow-pox lymph; but cattle, even when effectually vaccinated, which is often a difficult task, readily take rinderpest, often in its most mortal forms. Inoculation with the discharges from mild cases and from young calves has been tried as a palliative; but the disease, thus artificially developed, loses nothing either of its severity or of its dangerous contagious character. Cattle in Oxfordshire receiving for several weeks daily doses of sulphite of soda are stated to have had the plague in a mild form.

Where an outbreak occurs, the diseased animals must be promptly destroyed, and all cattle in immediate contact with them should likewise be slaughtered. This "stamping-out system" prevents the multiplication and diffusion of the virus, and hence saves still further losses. It is rigidly and successfully carried out in many

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continental countries. By stamping out and strict isolation, eight or ten outbreaks in Aberdeenshire were got rid of without serious loss. A French outbreak on the Belgian frontier in September 1865 was stamped out with the sacrifice of forty-three animals. The disease was imported to Paris in November by two gazelles purchased in London by the French Acclimatisation Society. Before it was stayed by slaughter and segregation, thirty-four animals, including yaks, antelopes, deer, gazelles, goats, and pecarri, died or were destroyed. The determined slaughter of diseased and infected animals, and the restrictions on the movement of all stock, were the only means that reduced the number of attacks during the British outbreak of 1865 and 1866. As is officially recorded in the Commissioners' Report, No. IV., p. 6, "where the percentage of killed is high, the ratio of increase of the disease is low, and *vice versa*. This has generally been noticed under each county and district."

When plague is in the neighborhood, it is desirable daily to sprinkle the walls, wood-work, and floor of the sheds and hovelling with carbolic acid solution, and to keep up throughout the premises a continual odor of this useful antiseptic, and with a diluted solution of the acid, or with M'Dougall's disinfecting soap, to wash over the cattle daily. The animals should be carefully fed on digestible soft food; receive daily about an ounce of sulphite of soda in a mash; and, in order to note the first access of the disease, should have their temperature examined by the thermometer every night and morning.

The recommendations of the Cattle-plague Commissioners for the purifying of infected sheds, litter, and manure must receive careful attention. In whatever premises infected beasts have stood, the walls should be lime-washed, a pint of carbolic acid being added to each pailful of the whitewash. The floors and wood-work, after being washed and scrubbed with boiling water, should be sprinkled with a strong solution of carbolic acid. The sheds being emptied of their living inhabitants, and the doors and windows closed, sulphur should be burned, and the vapors allowed to float about for a couple of hours before the sheds are again thrown open to the purifying influences of abundance of fresh air. A pound of sulphur placed on a shovel of burning coals suffices for a twelve-stalled shed or byre. Where cattle-plague has raged, this cleansing and fumigation should be repeated, and, if possible, several weeks allowed to elapse before the premises are again occupied by sound animals. All shovels, forks, buckets, or brooms that have either directly or indirectly come in contact with diseased or infected animals, should be washed with the carbolic acid solution. The clothes and boots of attendants, inspectors, and others coming in contact with plague-stricken animals must be similarly cleansed. The manure should be sprinkled with carbolic acid at intervals of a few days, and then covered over with a foot of earth, freely mixed with soil, or carted away and ploughed in. It is safer thus to put the manure on the arable land than to use it as a top-dressing for the pastures.

Authorities.—Official Reports of the Commissioners appointed to inquire into the Cattle-plague, Nos. I., II., III., and IV.; "The Cattle Plague," by Professor John Gamgee.

CATTO'LICA, a town of Sicily, in the province of Girgenti, and 14 m. N.W. of the city of that name. It has extensive sulphur-works, and a pop. of 7800.

CATTU'LLUS, Valc'rius, a celebrated Roman lyrist, was born at Verona, 87 B.C. His father was an intimate friend of Julius Cæsar, and the young poet must have frequently met the great warrior at the paternal residence, when the latter was on his way to Gaul. In early life, he went to Rome, where his career was that of an Epicurean, and the expense of this kind of living soon involved him in pecuniary difficulties. To release himself from these, he followed the prætor Memmius to Bithynia, with the intention, like his superior, of wringing a fortune out of the provincials. This fashionable art of felonious method of acquiring money did not succeed in C.'s case, mainly however, through the more dexterous cupidity of Memmius. After his return, C. appears to have lived mostly in Rome, and in very straitened circumstances. When he died is unknown. His poems, 116 in number, chiefly consisting of lyrics and epigrams—first brought to light by Benvenuto Campesani of Verona in the beginning of the 14th c.—have always been justly admired for their exquisite grace and beauty of style; but are, in many places, grossly indecent. In higher styles of writing C. was equally successful, especially

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in his odes, of which, unfortunately, only four have been preserved. His heroic or narrative poem on the marriage of Peleus and Thetis—consisting of more than 400 hexameter lines—and the wild enthusiastic poem entitled "Atys," are especially worthy of notice. Most of the earlier editions of C. include the works of Tibullus and Propertius. The best modern editions are by Silig (1823), Lachmann (1829), and Ellis (1867 and 1878). There are English translations by Lamb (1821), Martin (1861), Cranstoun (1867), &c. See Munroe's "Criticisms" (1878).

CAUB, a town of Nassau, North Germany, on the right bank of the Rhine, 21 m. n.n.w. of Wiesbaden. It is noteworthy as the place where Blücher crossed the Rhine with his army, Jan. 1, 1814; and also as the place where, till 1866, toll was levied by the Duke of Nassau—the only ruler who kept up this feudal privilege—from vessels navigating the Rhine. C. has underground slate-quarries; and opposite, on an island in the river, where Louis le Débonnaire died, 840, is a castle called the Pfalz, built in 1326, and which is said to have been resorted to for safety by the Countesses Palatine during their confinement. C. is threatened with destruction by the disintegration of the mountains behind, and in March, 1876, a destructive landslip took place. Pop. (1871) 2098.

CAU'CA, a river of the United States of Colombia, in South America, which, after flowing 500 miles to the n.e., joins the Magdalena on the west, 150 m. from the Caribbean Sea. It gives name to a department of 260,000 sq. m., and (1870) 445,000 inhabitants.

CAUCA'SIAN VARIETY OF MANKIND, an ethnological division adopted by Blumenbach, which included all the inhabitants, ancient and modern, of Europe (except the Finns); in Asia, the Hindus (of high class at least), Persians, Assyrians, Arabians, Jews, Phœnicians, inhabitants of Asia Minor and of the Caucasus, &c.; and in Africa, the Egyptians, Abyssinians, and Moors. What Blumenbach had called Caucasians, Dr. Prichard, who may be said to have laid the real foundation of ethnology, makes to consist of two independent groups or varieties grounding on a radical difference of language. One of these is the Syro-Arabian or Semitic (q. v.) race, and the other the Indo-European or Aryan (q. v.) race. The inhabitants of the Caucasus, so long held to be types of the European variety, are now by some excluded from it altogether, and classed with the sallow flat-faced Mongols to which it is considered the nature of their language and other facts ally them more closely than the symmetry of their shape and complexion do to the European variety. The narrow basis upon which the theory of the Caucasian type was first formed is thus stated by Dr. Latham: "Blumenbach had a solitary Georgian skull; and that skull was the finest in his collection—that of a Greek being the next. Hence it was taken as the type of the skull of the more organised divisions of our species. More than this, it gave its name to the type, and introduced the term *Caucasian*. Never has a single head done more harm to science than was done in the way of posthumous mischief by the head of this well-shaped female from Georgia." See ETHNOLOGY.

CAU'CASUS, a mountain range of great geographical and ethnographical importance, occupying the isthmus between the Black Sea and the Caspian, its general direction being from west-north-west to east-south-east—from the peninsula of Taman on the Black Sea, in lat. 45° 10′ n., long. 36° 45′ e., to the peninsula of Apsheron on the Caspian, in lat. 40° 20′ n., long. 50° 20′ e.—a length of about 750 miles. The breadth, including the secondary ranges and spurs, may be stated at about 150 miles, but the breadth of the higher C. is much less, not much exceeding 60 or 70 miles. This range, formerly belonging entirely to Asia, now forms part of the boundary line between Europe and Asia. The higher and central part of the range is formed of parallel chains, not separated by deep and wide valleys, but remarkably connected by elevated plateaus, which are traversed by narrow fissures of extreme depth. The highest peaks are in the most central ridge or chain—Mount Elburz attaining an elevation of 18,000 feet above the sea, while Mount Kasbeck reaches a height of more than 16,000 feet, and several others rise above the line of perpetual snow, here between 10,000 and 11,000 feet high; but the whole amount of perpetual snow is not great, nor are the glaciers very large or numerous. This central chain is formed of trachyte. The secondary parallel chains are, on the inner side, mostly formed of argillaceous slate and Plutonic rocks; on the outer side,

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of limestone. The spurs and outlying mountains or hills are of less extent and importance than those of almost any other mountain range of similar magnitude, subsiding as they do until they are only about 200 feet high along the shores of the Black Sea. Some parts are entirely destitute of wood, but other parts are very densely wooded, and the secondary ranges, near the Black Sea, exhibit most magnificent forests of oak, beech, ash, maple, and walnut; grain is cultivated in some parts to a height of 8000 feet, while, in the lower valleys, rice, tobacco, cotton, indigo, &c., are produced. As might be expected from the geographical situation of the C., the climate, though it is generally healthy, is very different on the northern and southern sides, the vine growing wild in great abundance on the south, which is not the case on the north. The s. declivity of the mountains, towards Georgia, presents much exceedingly beautiful and romantic scenery.

There are no active volcanoes in Mount C., but every evidence of volcanic action. There are mud volcanoes at each end of the range, and there are also famous naphtha springs in the peninsula of Apsheron. See BAKU. Mineral springs also occur in many places. The bison, or aurochs, is found in the mountains; in the forests are many fur-bearing animals; and game abounds. Bears, wolves, and jackal, are among the carnivorous animals. Lead, iron, sulphur, coal, and copper are found.

The waters of the C. flow into four principal rivers—the Kuban, and the Rion or Faz (the *Phasis* of the ancients), which flow into the Black Sea; and the Kur and the Terek, which flow into the Caspian. The Russians have carried a military road, with great labor and danger, through a valley somewhat wider than most of the Caucasian valleys, between the sources of the Kuban and the Terek. This road passes over a height of about 9000 feet, and is protected by many forts, but is exposed to other dangers besides those which arise from the hostility of the mountain tribes. The only other road is by the Pass of Derbend, near the Caspian Sea.

The resistance which the Caucasian tribes, for more than half a century, offered to the arms of Russia, attracted to them the attention of the world. But with the capture (1859) of the prophet-chief of the Lesghians—Schamyl, the most active and determined of the foes of Russia, who for a quarter of a century withstood and harassed the armies sent against him—the power of the Caucasians was greatly shattered; and after his death in 1871 the Russians regarded the territory as virtually subjugated. A large number of the Circassians elected to migrate to Turkish territory, where they were welcomed. The general name Circassians (q. v.) is often, but not very correctly, applied to the tribes which inhabit the Caucasus, and whose whole number is not above 1,300,000 or 1,500,000. From the situation of Mount C., there have gathered together in it tribes belonging to a greater number of distinct races that can perhaps be found within the same space anywhere upon the earth. There are more than 100 different languages or dialects spoken; the Turkish-Tartar language, however, serving for a general medium of communication. The different tribes inhabiting the C., long believed to be the purest type of the Indo-European family, are now considered not to belong to it at all, but to have more affinity with the Mongolian races. See CAUCASIAN VARIETY OF MANKIND. The principal tribes are the Tsherkesses or Circassians, Ossetes, Lesghians, Abchasians, Georgians, Suans, and Tchetches. The Georgians and Ossetes are at least nominally Christians; the Lesghians are fanatical Mohammedans. The Byzantine emperors and kings of Georgia planted Christian churches throughout this region, and many ruins of them remain, some of which are very beautiful. But the present Christianity of the nominally Christian tribes is more akin to heathenism than to true Christianity. In character, they are distinguished by their valor and love of freedom, but also by cruelty and treachery. They carry on a little agriculture, but live more by the care of their flocks, and by hunting—The Russian lieutenancy of the C., lying on both sides of the mountain range, has an area of 172,170 sq. miles, and a pop. (1871) of 4,893,332.

CAU'CUS. See AMERICANISMS.

CAUDEBEC-LÈS-ELBEUF, a town of France, in the department of Seine-Inférieure, 12 miles south of Rouen. It has manufactures of cloth, and a pop. of (1872) 10,715.—CAUDEBEC is also the name of a town in the same department, situated on the right bank of the Seine, 26 miles east of Havre. It is one of the prettiest and most picturesque little towns on the Seine, with its old wooden houses

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and elm-shaded quays. It has a fine Gothic church of the 15th c., and manufactures of cotton, sail-cloth, leather and soap. Formerly the capital of the Pays de Caux, C. was strongly fortified; and in 1419, so obstinate was its resistance, that it took the great English general, Talbot, six months to capture it. Pop. (1872) 1874.

CAUDE'TÉ, a town of Murcia, Spain, 50 miles east-south-east of Albacete. The inhabitants, 5500 in number, are chiefly engaged in agricultural pursuits.—C. is also the name of a small place in New Castile, a few miles from Teruel, where there are some of the largest bone-deposits, fossilised and unfossilised, in Europe.

CAU'DINE FORKS (*Furculæ Caudinæ*), two high, narrow, and wooded mountain-gorges near the town of Caudium, in ancient Samnium, on the boundary towards Campania. These gorges are celebrated on account of the defeat here suffered by the Romans in the second Samnite war (321 B. C.). Four Roman legions, commanded by the two consuls Titus Veturius and Spurius Postumius, after marching through a narrow pass, found themselves locked in a spacious valley, surrounded on all sides by lofty mountains, with no way out save that by which they entered, and another pass on the opposite side. Attempting to defile through the latter, they found it blocked up with trees and stones, and commanded by the Samnites, who had also in the meantime made themselves masters of the other pass. Consequently, the four legions were compelled to encamp in the valley. After some days, famine compelled them to surrender unconditionally. The Samnite general, Caius Pontius, according to old custom, compelled the Romans to pass under the yoke, and then permitted them to march back. This submission was regarded as too ignominious for Rome, and consequently the two consuls and the other commanders were delivered again into the hands of the Samnites, who, however, refused to have them.

CAUL is a thin membrane encompassing the heads of some children when born, and is mentioned here on account of the extraordinary superstitions connected with it from very early ages down to the present day. It was the popular belief that children so born would turn out very fortunate, and that the C. brought fortune to those purchasing it. This superstition was so common in the primitive church, that St Chrysostom felt it his duty to inveigh against it in many of his homilies. In later times, midwives sold the C. to advocates at enormous prices, "as an especial means of making them eloquent," and to seamen, as an infallible preservative against drowning. It was also supposed that the health of the person born with it could be told by the C., which, if firm and crisp, betokened health, but if relaxed and flaccid, sickness or death. During last century, it was common to find advertisements in the newspapers of cauls to be sold—from £10 to £80 being the prices asked for them. So recently as 8th May 1848, there was an advertisement in the "Times" of a C. to be sold, which "was afloat with its late owner thirty years in all the perils of a seaman's life, and the owner died at last at the place of his birth." The price asked was six guineas. Sir John Offley, of Madeley Manor, Staffordshire, by his will, proved at Doctors' Commons 1658, devised a C. set in jewels, which had covered him when he was born, to his daughter, thereafter to her son, and then to his own heirs-male. The C. was not to be concealed or sold out of the family. See Brand's "Popular Antiquities," vol. iii.; "Notes and Queries," 1st series, vol. vii.

CAULAINCOURT, Armand Augustin Louis de, Duke of Vicenza, a statesman of the French empire, was born at Caulaincourt, a village in the department of Somme, December 9, 1772. He entered the army at the age of fifteen, rapidly attained promotion, and, as colonel of a regiment of carbineers, distinguished himself in the campaign of 1800. He was made a general of division in 1805, and shortly after created Duke of Vicenza. In 1807, he was appointed ambassador at St Petersburg, where he soon gained the confidence of the czar, who often made use of his advice. Disputes having arisen between Alexander and Napoleon, C. endeavored to restore amity and prevent war; but his proposals being rejected, he, in 1811, asked permission to resign his post, and received an appointment in the army of Spain. During the events of 1813, he was frequently employed as plenipotentiary in diplomatic affairs. In November of 1813, he was made Minister for Foreign Affairs, and in this capacity attended the congress at Chatillon, January 1814. When Napoleon abdicated, C. endeavored to make use of his influence with Alexander to obtain the most favorable conditions for the fallen emperor, and, chiefly through his intervention, the island of Elba was ceded to Napoleon. During the Hundred Days, C. re-

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sumed office as Minister of Foreign Affairs, and was made a peer. On the second restoration, he retired into private life. He died in Paris, February 19, 1827.—His brother, AUGUST JEAN GABRIEL, Count of Caulaincourt, born 1777, served with distinction in all the campaigns from 1792 to 1812, when he fell in battle.

CAU'LIFLOWER, a variety of the common kale or cabbage, affording one of the most esteemed delicacies of the table. It was cultivated as a culinary vegetable by the Greeks and Romans. Its culture was, however, little attended to in England till the end of the 17th c.; but after that time, it rapidly increased, and prior to the French Revolution, C. formed an article of export from England to Holland, whilst English C. seed is still preferred on the continent. The C. is entirely the product of cultivation. The leaves are not in this, as in other varieties of the same species generally, the part used, nor are they so delicate and fit for use as those of most of the others, but the flower-buds and their stalks, or, properly speaking, the inflorescence of the plant deformed by cultivation, and forming a head or compact mass generally of a white color. There are many subvarieties, but all of them are rather more tender than the ordinary forms of the species, and in Britain generally require more or less protection during winter, whilst the seed is sown on hotbeds, that the plants may be ready for planting out in spring. Later sowings are made in the open ground. The C. requires a moist rich loamy soil, with abundance of manure, and above all, very careful cultivation, which is directed to the object of having the heads not merely large, but as compact as possible. Great care is bestowed on the selection of proper plants for seed. In Scotland, C. plants almost always require the protection of the frame during winter. C. may be preserved for some time fit for use by pulling the plant up by the roots, and hanging it in a cold and dry place.—BROCCOLI (q. v.) may be regarded as another kind of cauliflower.

CAULKING is the operation of driving oakum or untwisted rope into the seams of a ship, to render them water-tight. The quantity thus driven in depends on the thickness of the planking; it varies from 1 to 13 double threads of oakum, with one or two single threads of spun-yarn. The caulker first *reims* or *reems* the seam—that is, drives a C. iron into it, to widen the seam as much as possible, and close any rents or fissures in the wood; he then drives in a little spun-yarn or white oakum with a mallet and a kind of chisel, and afterwards a much larger quantity of black or coarse oakum. The fibres are driven in until they form a densely hard mass, which not only keeps out water, but strengthens the planking. The seam is finally coated with hot pitch or resin.

CAULO'PTERIS, a generic name for the stems of fossil tree-ferns found in the Carboniferous and Triassic measures. They are hollow, and covered with the markings similar to the leaf-scars on recent tree-ferns. Twelve species have been described.

CAUSE. The words "Cause," "Causality," and "Causation," although familiar and intelligible in ordinary speech, have given rise to some of the most subtle questions in philosophy and theology. We shall here advert briefly to the chief meanings of these terms, and in so doing we shall indicate the disputes that have arisen in connection with them.

In common language, we are accustomed to describe as the C. of an event, the one event immediately preceding it, and but for which it would not have happened. A man slips his foot on a ladder, falls, and is killed: we give the slipping of the foot as the C. of the fatality. A legislative assembly decides a question of great moment by the casting vote of the president, who is then not unfrequently spoken of as the C. of all the good or evil that followed on the decision. Now, a slight examination shews that this mode of speaking is defective, as not expressing the whole fact, or, in other words, presumes a great deal that is not stated. In the supposed death from a fall, there are many conditions necessary to the result besides the slipping of the foot: the weight of the body, the height of the position, the hardness of the ground, the fragility of the human frame, all enter into the C. strictly represented; but for practical purposes, we leave out of account all those elements that are not at the moment under our control, and allude to the one that is so. And when we speak of the decision of an assembly being the effect of the president's vote, we mean that his share in the responsibility is peculiarly great, or that, in order to turn the vote in one way, all that is necessary is to secure his individual opinion. If we do not enumerate all

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the conditions of the event, it is because some of them will, in most cases, be understood without being expressed, or because, for the purpose in view, they may without detriment be overlooked.

When, however, we aim at strict accuracy, as in the investigations of science, we must not be content with singling out the one turning event, but must enumerate everything that is necessary to the result. A *scientific* C. is the full assemblage of *conditions*, failing any one of which, the effect would not happen. In a full explanation of the phenomenon of the tides, we must enumerate all the circumstances connected with their production—the attraction of the sun and moon, the motions of the earth and the moon in their orbits, the globular form and rotation of the earth, the liquidity of the sea, the mode of distribution of the sea over the earth—every one of which facts is an essential in the full causation. The effect cannot be adequately accounted for without adverting to every one of those conditions, and it is therefore the sum-total of them that is rightly described as the C. of the tides. Taking this complete view of causation, it is found that every event that happens is the sequel to some previous event, in whose absence it would not have been, but which being present it is sure to occur. Between the phenomena existing at any instant, and the phenomena existing at the succeeding instant, there is an invariable order of succession; to certain facts, certain facts always do, and, as we believe, will continue to succeed. The invariable antecedent is termed the C.; the invariable consequent the effect. What is termed the *Law of Universal Causation*, consists in this, "that every consequent is connected in the manner now described with some particular antecedent, or set of antecedents."—Mill's "Logic," book iii. chap. 5.

The physical philosopher—the chemist or physiologist—trusts to the uniformity with which the same C. yields the same effect; and if he can find out the true succession in one instance, he is satisfied that the same succession will always hold. In the physical sciences, therefore, there is no dispute as to the law of causation itself; the controversies on that head occur only in *metaphysics*. It is made a serious problem by mental philosophers, and also by theologians, to determine how we come by the irresistible belief that we are said to possess, that every event has, and must have a cause. There are many answers to this question: *eight* are enumerated by Sir William Hamilton ("Discussions on Philosophy," p. 611, 2d edit.). It is only necessary, however, to advert to the two radically opposite points of view from which the subject is now surveyed.

The one view is, that we have an instinct or *intuition* of the mind by which we are compelled to recognize this law, so that to us it is a necessary truth, which we cannot escape from if we would. Our experience of the outer world, doubtless, shews us that things follow one another in an orderly and uniform manner, that the stone that sinks in water to-day does not float to-morrow, but no experience could give us the sense of commanding necessity that we have of the law of C. and effect. "Causation is not the mere invariable association of antecedent and consequent; we *feel* that it implies something more than this." The philosophers who maintain this side give forth two different affirmations; the *one*, that we actually possess an intuitive belief of necessary causation; and the *other*, that our possession of the belief is a sufficient proof that the law actually pervades the universe. Experience operates to confirm us in those instinctive tendencies, but no amount of experience would have been able to create them.

The latest modification of the theory that ascribes our belief in causation to an intuition of the mind, is the doctrine promulgated by Sir W. Hamilton, to the effect that "we are unable to think that the quantity of existence, of which the universe is the conceived sum, can be either amplified or diminished. We are able to conceive, indeed, the creation of a world; this, in fact, as easily as the creation of an atom. But what is our thought of creation? It is not a thought of the mere springing of nothing into something. On the contrary, creation is conceived, and is by us conceivable, only as the evolution of existence from possibility into actuality, by the fiat of the Deity. And what is true of our concept of creation, holds of our concept of annihilation. We can think no real annihilation—no absolute sinking of something into nothing." "Discussions," p. 619. Thus, every effect must have a C., and every C. must have its effect, because, if it were not so, there would be either a pure creation or a pure annihilation, neither of which, according to Sir W. Hamilton, is thinkable or conceivable by the human mind. This

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doctrine, however, has not found acceptance even by those who, if not actual disciples of the author, are most disposed to receive his philosophy generally, as may be seen by referring to Professor Fraser's "Essays in Philosophy," p. 170; M'Cosh "On the Divine Government," p. 529, 4th edition; and Mansel, art. Metaphysics, "Encyclopædia Britannica." So far from the creation or annihilation of matter or force being inconceivable, it may be said with truth, that until the end of last century, it was not known as a fact that the materials of the globe are absolutely indestructible. The effects of combustion and evaporation could hardly suggest anything else than the annihilation of a certain portion of material. Combustion merely transformed the material consumed into other shapes, nothing being absolutely lost. So much for ponderable matter. As regards force, or moving power, the demonstration that this is never absolutely lost, even on the many occasions when it is so to all appearance, is a still later result of laborious scientific inquiries, being, in fact, one of the conclusions arrived at within the last few years. See Force. To represent, therefore, one of the latest achievements of experimental science as a primitive intuition of the human mind, is to violate, in the strongest manner, our sense of propriety and consistency.

As opposed to the intuitional doctrine of causation, we have a variety of views by Hume, Dr Thomas Brown, and others, which need not be specified in detail. One may be given as an example. It has been seen that there are two affirmations in the theory just discussed; that the mind possesses an intuitive belief of causation, and that the possession of this belief is evidence of the existence of the law. Now, one or both of these affirmations may be denied; and the *denial* of either, by even a small minority of the human race, is held to be fatal to the theory, because *unanimity* is essential to the establishment of a universal instinct. Now, many men may possess an instinctive belief in the necessity of a cause to all effects, and of an effect to all causes; some, it is affirmed, do not; it cannot, therefore, be a universal or essential part of human nature.

In like manner, the second affirmation—namely, that the possession of an instinctive belief is a proof of the truth of the thing believed—is denied, on the ground that our instincts often dispose us to believe things that experience shews to be untrue. We have a strong natural tendency to believe in the universality and continuance of the exact order of things that we are ourselves born into, and are only put right by seeing the contrary. "A mere disposition to believe, even if supposed instinctive, is no guarantee for the truth of the thing believed. If, indeed, the belief ever amounted to an irresistible necessity, there would be then no *use* in appealing from it, because there would be no possibility of altering it. But even then the truth of the belief would not follow: it would only follow that mankind were under a permanent necessity of believing what might possibly not be true; just as they were under a temporary necessity—quite as irresistible while it lasted—of believing that the heavens moved, and the earth stood still. But, in fact, there is no such permanent necessity. Many of the propositions of which this is most confidently stated, great numbers of human beings have disbelieved. The things which it has been supposed that nobody could possibly help believing, are innumerable; but no two generations would make out the same catalogue of them."—Mill's "Logic," book iii. chap 21. Mr Mill and others hold that the proof of the law of causation rests exclusively on the uniform and growing experience of the human race. This, however, is not inconsistent with our possessing the natural instinct above alluded to, by which we are led to suppose that what is will continue, and what has been will be repeated; an instinct that *coincides*, to a certain extent, with the law of C. and effect, and is therefore a predisposition on our part to accept what experience teaches on this head. It is only maintained that the instinct is of itself *no proof*, although useful in so far as it prepares us for what there is real evidence for believing. By yielding to the instinct in its crudest shape, the inhabitant of the tropics scouts the idea that water can ever be solid; the African would deny the existence of white men; and even an intelligent European could not be persuaded that any metal would float. Experience must correct the instinctive tendencies, otherwise no reliance can ever be placed upon them; by which we acknowledge it as the sole test of truth, while intuitive dispositions are no test whatever.

Even those who maintain the instinctive necessity of the conviction we are dis-

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causing, admit two great exceptions—viz., the existence of a FIRST C., itself uncaused, and the Liberty of the Will, or the exemption of human actions from the rule that applies so strictly to physical nature.

It is further contested between the two opposite schools of philosophy, whether or not MIND be the sole ultimate C. of all phenomena, as it is the C. most familiar to us—namely, the source of our voluntary exertions. On one side, it is affirmed to be "inconceivable that dead force could continue unsupported for a moment beyond its creation. We cannot even conceive of change or phenomena without the energy of a mind." "The word action has no real significance, except when applied to the doings of an intelligent agent." "Phenomena may have the semblance of being produced by physical causes, but they are in reality produced by the immediate agency of a mind; if they do not proceed from the human, they are the result of the divine will." To this it is replied, that we are here taking for granted that every kind of power is analagous to that which we happen to be first acquainted with: but it is a pure assumption without proof or relevance to suppose that all modes of energy must conform to this one type.—Mill, book iii. chap. 5. It is further pointed out that even in ourselves, pure mind, or mind acting by itself, is not known to be an efficient C.; it must be mind together with body. The laborer cannot sustain a day's toil merely because of his *wish* to do so; he must be fed, and rested, and have all his bodily organs in good condition, in order to do his work. The human system, when employed as a prime mover, can no more dispense with the material conditions, than a steam-engine can work without coal, or when out of repair.—Bain "On the Emotions and the Will," p. 472.

The subject of causation was very particularly studied by Aristotle. He enumerated four different kinds of causes, which have ever since had a place in philosophy. These are the *material*, the *formal*, the *efficient*, and the *final*. The first, or *material*, is what anything is made of; brass or marble is the material C. of a statue. The *formal* is the form, type, or pattern according to which anything is made; the drawings of the architect would be the formal C. of a house. The *efficient* is the power acting to produce the work, the manual, energy and skill of the workmen, or the mechanical prime mover, whether that be human or any other. The *final* C. is the end or motive on whose account the work is produced, the subsistence, profit, or pleasure of the workman. Aristotle mentions the case of a physician curing himself, as exemplifying all the causes in one and the same subject. It is obvious that these are what we should now term the aggregate of *conditions* necessary to the production of any work of man; it being essential that there should be a motive for the work (final), a material to operate upon (material), a plan to proceed by (formal), and an exertion of energy to do what is wanted (efficient). When nature is viewed as the result of a creative mind, these causes are considered as inhering in the Divine contriver.

In popular language, C. is held as identical with *explanation*. In other words, when a phenomenon which we are puzzled to account for is explained to our satisfaction, we say that we know its cause, but we often seek for, and are satisfied with, explanations that have no value in the view of science; and on the other hand, refuse to rest content with such as are scientifically valid. People occasionally insist on knowing the C. of gravity itself, something deeper than the discovery of Newton, and whatever explanation satisfies the mind, would be accepted as the cause. Sometimes a theological explanation is offered, and at other times, a metaphysical necessity is put forth.

CAU'STIC (Gr. burning), in Medicine and in Chemistry, is the term applied to such substances as exert a corroding or disintegrating action on the skin and flesh. *Lunar C.* is nitrate of silver, and *common C.* is potash. When used as a C. in medicine, the substance is fused and cast into moulds, which yields the C. in small sticks the thickness of an ordinary lead pencil, or rather less.—*Caustic* is also used in chemistry in an adjective sense—thus C. lime, or pure lime (CaO), as distinguished from mild lime, or the carbonate of lime (CaO,CO_2), C. magnesia (MgO), and mild magnesia (MgO,CO_2), &c.

CAUSTIC, Catacaustic, and Diacaustic. In Optics, Caustic is the name given to the curved line formed by the ultimate intersections of a system of rays reflected or refracted from a reflecting or refracting surface, when the reflec-

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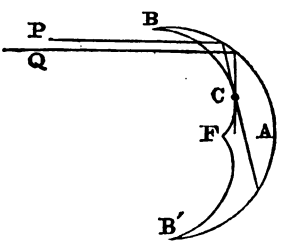
tion or refraction is inaccurate. When the caustic curve is formed by reflection, it is called the Catacaustic—sometimes simply the Caustic, when formed by refraction, it is called the Diacaustic Curve. In mathematical language, a curve formed by the ultimate intersections of a system of lines drawn according to a given law is called the *envelope*, and is such that the lines are all tangents to it. As in a system of rays reflected or refracted by the same surface *all* follow the same law, it follows that the C. is the envelope of reflected or refracted rays.

An example of the catacaustic is given in the annexed figure for the case of rays falling directly on a concave spherical mirror, Bab', from a point so distant as to be practically parallel. The curve may be said to be made up of an infinite number of points, such as C, where two very near rays, such as P, Q, intersect after reflection. This catacaustic is an epicycloid. The curve varies, of course, with the nature of the reflecting surface. In the case represented in the figure, the cusp point is at F, the principal focus. No such simple example can be given of the diacaustic curve as



that above given of the catacaustic. It is only in the simplest cases that the curve takes a recognisable form. In the case of refraction at a plane surface, it is shewn that the diacaustic curve is the evolute either of the hyperbola or ellipse, according as the refractive index of the medium is greater or less than unity.

The reader may see a catacaustic on the surface of tea in a tea-cup about half full, by holding the circular rim to the sun's light. The space within the caustic curve is all brighter than that without, as it clearly should be, as *all* the light reflected affects that space, while no point without the curve is affected by more than the light reflected from half of the surface.

CAU'TION, in the Law of Scotland, like Guaranty (q. v.) in England, is an obligation undertaken by a second party, whereby he binds himself, failing the primary obligant, to fulfil his obligation, whether it be of a pecuniary nature or otherwise. Cautionary obligations, like engagements of guaranty, are thus essentially of a secondary nature; and previous to the passing of the Mercantile Law Amendment Act (19 and 20 Vict. c. 60), it was customary in Scotland to distinguish between what was called *cautionary proper*, where the cautioner was bound avowedly as such, and *improper cautionary*, where both cautioner and principal were bound as principals. Since this period (1856), however, cautionary proper has ceased to exist otherwise than as the result of positive stipulation, under the saving-clause attached to the eighth section of the statute referred to, which enacts that "nothing herein contained shall prevent any cautioner from stipulating, in the instrument of caution, that the creditor shall be bound, before proceeding against him, to discuss and do diligence against the principal debtor." Cautionary obligations are generally gratuitous, being, for the most part, undertaken from motives of friendship; but it is by no means uncommon for them to be entered into in consideration of a premium paid by the person guaranteed, or by those interested in his fortunes. The existence of such a consideration has always been optional in Scotland, and this rule has recently been adopted in England (19 and 20 Vict. c. 97, § 8). Where a premium is paid, the transaction becomes a mere insurance of solvency, honesty, or efficiency; and Associations of great public utility (see GUARANTEE ASSOCIATION) have been

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formed, both in England and Scotland, for the purpose of undertaking, as a speculation, to guarantee the good conduct of persons employed either in public or private offices of trust. The tendency of judicial decisions, both in England and Scotland, for many years past, has been to require greater strictness than formerly in the constitution of cautionary obligations; and latterly, the legislature itself has stepped in with the same object in view. By the statute which we have already quoted, it is enacted that all such engagements shall be in writing, subscribed by the person undertaking or making them, or by some person duly authorised by him, otherwise they shall have no effect. If a cautionary obligation is dependent on a condition, it will, of course, be ineffectual unless the condition be complied with. The cautioner may, in general, plead every defence which was competent to the principal debtor, and the extinction of the primary obligation extinguishes the secondary one. The discharge of one cautioner, moreover, unless consented to by the rest, is a discharge to all. Cautioners bound subsequent to the passing of the act mentioned have, in consequence of the eighth section already referred to, no right to what in Scotland was called Discussion (q. v.); but those bound prior to that act are entitled, as formerly, to require that the creditor shall first call on the principal debtor, and compel him to pay in so far as he is able, or, in law language, *discuss* him. The cautioner is entitled, on payment of the obligation, to an assignation of the debt and diligence, by which means he comes, in all respects, into the creditor's place; and, moreover, if the solvency or other conditions of the principal debtor should seem precarious, he may adopt legal measures for his relief. Co-cautioners, or persons bound together, whether their obligations be embodied in one or several deeds, are entitled to mutual relief. But where a co-cautioner obtains relief from the others, he must communicate to them the benefit of any deduction or ease which may have been allowed him in paying the debt.

Cautionary obligations are often undertaken in behalf of persons in situations in which the engagements and liabilities are prospective. In order that such obligations may be binding, the nature and extent of the liability must be fairly and fully disclosed to the cautioner. But while the cautioner must not be exposed to the danger arising from any transaction not in his view in entering into the contract, he is not entitled to withdraw without due notice and a reasonable time being given for entering into a new arrangement. The question whether the effects of a bond are prospective, or retrospective merely, will depend on its terms; the *presumption*, where these are in any way doubtful, being always in favor of the latter alternative. The creditor is bound to exercise a certain degree of vigilance over the conduct and circumstances of the person guaranteed, and not to permit any very gross departure from the terms of the contract, to the prejudice of the cautioner. Should this obligation be neglected, the cautioner will be freed from his obligation.

CAUTION, for a cash credit. See CASH ACCOUNT.

CAUTION, Judicial, in the Law of Scotland, is of two kinds—for appearance, and for payment. If a creditor makes oath before a magistrate, that he believes his debtor to be meditating flight (*in meditatione fugæ*), he may obtain a warrant for his apprehension; and should he succeed in proving the alleged intention to flee, he may compel him to find C. to abide the judgment of a court (*judicio sisti*). The second kind of judicial C. is by *Bond of Presentation*, which is granted when the creditor is about to execute personal diligence, or has done so, and the cautioner, on condition of an indulgence to the debtor, binds himself that the debtor shall be forthcoming at the appointed time, otherwise he himself will pay the debt. The object of this form of C. is simply to protect the debtor from imprisonment, and allow him time.

CAUTION, Juratory. See "Poor's Roll," and 13 and 14 Vict. c. 36, § 34.

CAUVERIPU'RAM, a town of the district of Coimbatoor, in the presidency of Madras, on the right bank of the Cauvery, in lat. 11° 54′ n., and long. 77° 43′ e. It takes its name from the neighboring gorge of 30 miles in length through the Eastern Ghauts, along which the Cauvery finds a passage. Pop. of C. (or *Kaveripuram*) in 1871, 6532.

CAU'VERY, or Kaveri, a river in the south of Hindustan, rising in Curg, and flowing through Mysore and Madras, with a course of 472 miles, into the Bay of Bengal by various mouths. Its delta, with a coast of 80 miles, and a depth of 70, lies almost wholly in the district of Tanjore. The C. is peculiarly available for irri-

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gation; and for improving it in this respect, a grant of £50,000 was sanctioned in 1841. During the rainy season, the stream is navigable for small-craft.

CA'VA, La, a town of Italy, in the province of Salerno, 3½ miles n.w. of the town of Salerno. It is a flourishing place, with manufactures of silk, cotton, linen, and pottery. Pop. 6397. About a mile from C. is the celebrated Benedictine monastery of the Trinity, with its magnificent archives, containing 60,000 MSS. and 40,000 parchment rolls. Its library, at one time also rich in MSS. and rare printed books, has been dispersed. In the monastery church are the tombs of Queen Sibilla and of various anti-popes.

CAVAIGNAC, Louis Eugène, was born in Paris 1802, and was educated in the Polytechnic School, and the *Ecole d'Application* at Metz. He first served in the Morea, and afterwards in Africa (whither he was sent in 1832 into a kind of honorable exile, in consequence of a too free expression of opinion in favor of republican institutions), where he acquired great distinction by his energy, coolness and intrepidity. He was made chef de bataillon in 1837, and rose to the rank of brigade-general in 1844. In 1848, he was appointed governor-general of Algeria, but in view of the impending revolutionary dangers, was called to Paris, he having also been elected as a delegate to the National Assembly by the two departments of Lot and Seine. In the insurrection of June which followed, C., as Minister of War, had a most difficult task to play, and he displayed, during the four days and nights of the contest, remarkable presence of mind, firmness, and activity. His plan of action appeared strange and almost traitorous at the time. In opposition to the wishes of the National Assembly, who desired that the troops should be dispersed over Paris, he divided his men into three separate bodies, which had to clear their several routes from obstacles, in order to effect a reunion, streets and even quarters of the city being left for some time without military protection. Regarding the outbreak more as the beginning of a civil war than a mere insurrection, he, in fact, met the insurgents in true order of battle. His operations were successful, and his clemency was as remarkable as his generalship. When he had the power of assuming the dictatorship, he resigned it into the hands of the National Assembly, which appointed him President of the Council. As a candidate for the presidency of the republic, when Louis Napoleon was elected, he received about a million and a half of votes. On the *coup d'état* of December 1851, C. was arrested, but released after a short detention; and though he consistently refused to give in his adhesion to the Empire, he was permitted to reside in France without molestation. He died very suddenly of heart disease in October 1857, at his country house near Tours, and was buried in the cemetery of Montmartre, Paris, in presence of many thousand spectators, including several republican leaders. In debates, C. was remarkably unlike his countrymen, being not voluble and declamatory, but sober, clear, and moderate.

CAVALIE'R in Fortification, is a defence-work constructed on the *terre-plein* or level ground of a bastion. It rises to a height varying from 8 to 12 feet above the rampart, and has a parapet about 6 feet high. Its uses are to command any rising ground held by the enemy, within cannon-shot; and to guard the curtain, or plain wall between two bastions, from being enfiladed. For these purposes, it mounts heavy ordnance. It may be either curved, or bounded by straight sides.

CAVALIE'R (Fr. *chevalier;* Ital. *cavaliere;* Span. *caballero*, probably from the Latin *caballus*, a horse), originally meant any horse-soldier, but in English history is the name given to the party which adhered to King Charles I., in opposition to the Roundheads (q. v.) or friends of the Parliament.

CAVALLER-MAGGIO'RE, a town of North Italy, in the province of Cuneo, 24 miles north-east of Coni. It was formerly fortified and defended by two castles, but of these there is now hardly a vestige remaining. It is a busy place, with a population of 5300.

CA'VALRY is a general name for horse-soldiers or troopers. The subdivisions are very numerous; such as Guards, Dragoons, Lancers, Hussars, Cuirassiers, Mounted Rifles, &c. The C. force of the British army is usually divided into *Household* and *Line*. The numbers voted for 1876—1877 were:

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	Household Cavalry.	Line Cavalry, Home Service.	Line Cavalry in India.
Officers	81	558	234
Non-commissioned Officers	192	1,178	424
Rank and File	1,029	9,907	3,672
	1,202	11,643	4,330

The difference between the household C. and the line is this: The former belong to the *Guards*, a specially favored body of troops; while the latter comprise all who are *not* Guards. The regiments are 31 altogether. During more than half a century, the number was 26; but in 1858, two new regiments were created—to restore the 5th and 18th Dragoons which had been struck out of the army list in 1799 for disloyalty in the Irish Rebellion; and in 1862, 3 regiments were taken over from the abolished local European army of India. The list comprises 2 regiments of Life Guards (red), 1 of Horse Guards (blue), 7 of Dragoon Guards, and 21 of Dragoons. Of these last-named 21 regiments, the 1st, 2d and 6th are simply called Dragoons; the 5th, 9th, 12th, 16th, and 17th Lancers; the 3d, 4th, 7th, 8th, 10th, 11th, 13th, 14th, 15th, 18th, 19th, 20th, and 21st, Hussars. A distinction is often made between *heavy* and *light* C.; and, in continental armies, this distinction is very marked; but in England, the men and horses are not selected with much reference to this matter; the heavy being often too light, and the light too heavy, to correspond with their designations. In so far as the distinction holds in the British army, the Dragoon Guards, Horse Guards, and Life Guards are classed and equipped as heavy C., the Dragoons medium, and the Lancers and Hussars as light C., for scouring a country. It was in the capacity of light C. that the Prussian Uhlans played so important a part in the late war between Prussia and France, acting as wide-stretching feelers to the main bodies to which they were attached.

The line C. regiments in the British service have generally 8 troops of 55 rank and file each, with 88 commissioned and non-commissioned officers to the regiment. The officers for a full C. regiment comprise 1 colonel (as general officer), 1 lieutenant-colonel, 1 major, 8 captains, 18 subalterns and other commissioned officers, and 59 non-commissioned officers. A lieutenant-colonel in the Guards C. takes rank with a full colonel in the line C.; and a major in the former with a lieutenant-colonel in the latter—an arrangement that gives rise to some favoritism and jealousy; for the Guards are in no sense more meritorious soldiers than the line.

Nine months of drilling is the least time requisite to make a recruit fit to mount on duty, during which period he is drilled for eight hours a day. Londoners and agricultural laborers are mostly sought for; provincial mechanics are not found so available. The purchase of C. horses is an important matter. The veterinary surgeon of the regiment is sent out to buy, but no horse is paid for till approved by the commanding officer. The usual maximum of price fixed is £33 for a horse 3 to 5 years old, but the horse costs the nation £50 or £60 by the time it is thoroughly fit for service. See DRAGOONS, GUARDS, LANCERS, &c.

CAVALRY TACTICS. Authorities differ concerning the proportion that ought to be observed between cavalry and infantry in an army. In France and Austria the ratio is about 1 to 5; in Prussia and Bavaria, 1 to 4; in Russia, 1 to 6; in England, 1 to 8.

So far as concerns actual duties, heavy calvary charge the enemy's cavalry and infantry, attack the guns, and cover a retreat; while the light cavalry make reconnaissances, carry dispatches and messages, maintain outposts, supply pickets, scour the country for forage, aid the commissariat, pursue the enemy, and strive to screen the movements of the infantry by their rapid manœuvres on the front and flanks of their army. At the battle of Balaklava, the heavy cavalry charge was within the reasonable duties of the troops, but that of the light cavalry was not; the former succeeded, the latter failed. A cavalry horse will walk 4 miles in an hour on general service, trot 8 miles in manœuvering, and gallop 11 miles in making a charge. The cavalry usually attack in line against cavalry, *en échelon* against artillery, and in column against infantry. When an attack is about to be made, the cavalry usually group into three bodies—the attacking, the supporting, and the reserve. Close combat and hand to-hand struggle are the province of cavalry; infantry and artillery

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may fight at a distance, but cavalry cannot. It is rare that two bodies of cavalry stand to fight each other; the weaker of the two, or the less resolute, usually turns and gallops off. The work to be done by the horse is to pursue, to overwhelm, to cut down. They cannot wait to receive an attack like infantry; they must either pursue or retreat; and on this account it has been said, "rest is incompatible with cavalry." The infantry and artillery more frequently win the victory; but the cavalry prepare the way for doing this, capture prisoners and trophies, pursue the flying enemy, rapidly succor a menaced point, and cover the retreat of the infantry and artillery, if retreat be necessary. Cavalry is necessary to finish off work mainly done by others; and without its aid, signal success is seldom obtained on the field. Many of the brilliant achievements of the British in 1857 and the following year, in India, were rendered almost nugatory by the paucity of cavalry, while, as a contrast the German victories of 1870 were enhanced by the splendid services of their Uhlans and other light cavalry.

CA'VAN, the capital of Cavan county, Ireland, is situated on a branch of the Annalee, 70 miles n.w. of Dublin, with which it is connected by the Irish N.W. Railway. The suburbs are chiefly wretched cabins. The principal buildings are in the west outskirts. A public garden was bequeathed by a late Lady Farnham, and the beautiful demesne of Lord Farnham lies between C. and Lough Oughter, which is about 5 miles w. Pop. (1871) 3389. Agriculture forms the chief industry of the people.

CAVAN, an inland county in the s. of Ulster, Ireland. It lies in the narrowest part of Ireland, 18 miles from the Atlantic, and 90 from the Irish Sea. Area 746 sq. m. About three-fourths is arable. Bogs and hills, with many small lakes, are found in the n.-w. The chief rivers are the Erne, the Woodford, and the Annalee. The e. half of C. rests on clay-slate and grauwacke; the mountain-district in the w. is carboniferous formation. Of minerals, C. affords coal, iron, lead, and copper, with many mineral springs. The climate is cold and damp; and the soil is poor, wet, and clayey, except along the streams. In 1875, of 477,360 acres, 156,312 were in crop, the chief crops being oats, potatoes, turnips, and flax. The farms are small. The population, which had fallen to 153,906 in 1861, was in 1871 only 140,785, of whom 113,174 are Roman Catholics, 21,223 Episcopalians, and the rest of other denominations. Agriculture forms the chief industry, but linen is manufactured to a considerable extent. Chief towns—Cavan, Bailieborough, and Belturbet. C. returns two members to parliament. The number of children attending school in the year ending March 31, 1876, was 31,868.

CAVARZE'RE, a town of Northern Italy, province of Venice, 22 miles south south-west of Venice city. Pop. 12,400. It is situated on the Adige, which divides it into two parts called C. *destro* and C. *sinistro*. Its soil is fertile, and its inhabitants carry on an active trade in cattle, silk, and wood for fuel.

CAVATI'NA, a short form of operatic air, of a soft character, differing from the ordinary aria in consisting only of one part, and that spun out more in the form of a song. Modern composers have, however, disregarded this difference. Rossini mixes both. Weber, in his operas, adds an introduction or a recitative. The most perfect specimen of the C. is that in Myerbeer's opera of "Robert the Devil."

CAVE, Edward, deserves mention as the founder of the "Gentlemen's Magazine," the first literary journal of the kind ever established. He was born at Newton, in Warwickshire, in 1691; obtained a good education at Rugby; and after many vicissitudes, became apprentice to a printer. Obtaining money enough to set up a small printing-office, he projected the "Gentlemen's Magazine," which has now existed more than a century and a quarter. He was the friend and early patron of Samuel Johnson. C. died January 1754.

CAVE, William, an English divine and scholar of distinction, was born at Pickwell, Leicestershire, December 1637. He studied at Cambridge; was appointed to the vicarage of Islington in 1662; afterwards to the rectory of Allhallows the Great, London; and in 1690 to the vicarage of Isleworth, Middlesex. He died at Windsor, August 4, 1713. He was the author of many works of a religious character, the most important of which are the "Lives of the Apostles," "Lives of the Fathers," and "Primitive Christianity," which were once standard works.

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CA'VEAT (Lat. *cavco*, to beware), a judicial warning or caution. Caveats, in England, are used to stop the enrolment of decrees in Chancery, the issuing of lunacy commissions, &c. It consists of an intimation by the party interested to the proper officer, to prevent him from taking any step without such intimation being made to the said party as shall enable him to appear and object.

CA'VENDISH, Henry, a distinguished philosopher of the 18th c., son of Lord Charles Cavendish, and nephew of the third Duke of Devonshire, was born at Nice, October 10, 1731. He studied at Cambridge, and devoted his whole life to scientific investigations. The large fortune which was bequeathed to him by an uncle, enabled him to follow uninterruptedly his favorite pursuits. He almost secluded himself from the world, and was so averse to meet with strangers, that he had his library—a magnificent one—built at a distance from his house, so that he might not encounter persons coming to consult it; and his female domestic servants had orders to keep out of his sight, on pain of dismissal. His dinner he ordered daily by a note placed on the hall-table. He died, unmarried, February 1810, leaving considerably more than a million sterling to his relatives. As a philosopher, C. is entitled to the highest rank. To him it may almost be said we owe the foundation of pneumatic chemistry, for prior to his time it had hardly an existence. In 1760, he discovered the extreme levity of inflammable air, now known as hydrogen gas—a discovery which led to balloon experiments, and projects for aërial navigation; and later, he ascertained that water resulted from the union of two gases—a discovery, however, to which Watt (q. v) is supposed to have an equal claim. The accuracy and completeness of C.'s processes are remarkable. So high an authority as Sir Humphry Davy declared, that they "were all of a finished nature, and though many of them were performed in the very infancy of chemical science, yet their accuracy and their beauty have remained unimpaired amidst the progress of discovery." C. also wrote papers on electricity, astronomical instruments, &c.

CAVENDISH, William, Duke of Newcastle, a distinguished loyalist of the 17th c., son of Sir Charles Cavendish, younger brother of the first Earl of Devonshire, was born 1592. His learning and winning address made him a favorite at the court of James I., who, in 1610, made him a Knight of the Bath. Other honors rapidly succeeded. In 1620, he was made a peer of the realm. Charles I., about 1628, gave him the title of Earl of Newcastle-upon-Tyne, and in 1638 intrusted him with the tuition of his son, afterwards Charles II. His support of the king during the contest with the parliamentary forces was munificent. He contributed £10,000 to the treasury, and raised a troop of 200 knights and gentlemen, who served at their own cost. As general of all the forces raised north of the Trent, he had power to issue declarations, confer knighthood, coin money, and raise men; and the last part of his commission he executed with great zeal. The banquets C. gave to the king when he went north were magnificent enough to find record in history; one of them cost no less than £15,000, even in those days when money was more valuable than it now is. After the battle of Marston Moor, C. retired to the continent, where he resided, at times in great poverty, until the Restoration. On his return, he was created Duke of Newcastle. He died December 25, 1676. On the continent, he devoted himself to literature, and wrote a book on the management of horses, and several plays, not of a character to increase any man's reputation for intelligence.

CAVENDISH, Margaret, Duchess of Newcastle, second wife of the above, born about the end of the reign of James I., is perhaps one of the most remarkable instances on record of a person afflicted with the *cacoëthes scribendi*, who had no capacity whatever for writing. She produced no less than 13 folio volumes, 10 of which were printed, treating, indifferently, on all subjects in prose and poetry, and careless in all, both as to grammar and style. Her mania for scribbling kept up her maids at night, so that, if she chanced to wake with anything on her mind, they might be ready to note it down at once. The duchess was relieved, but a dead weight fell upon the field of literature. She died in 1673.

CAVES, or Ca'verns (Lat. *cavus*, hollow), are hollow places in the earth. They are either natural or artificial. Natural C. have been produced by the fracture and dislocation consequent on the upheaval of the strata, by water, or by both causes combined. The denuding or eroding power of water, which has produced the materials of stratified rocks, has formed caverns in the courses of rivers and on the

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coast-line of the sea. The moving waters, carrying with them gravel and sand, enter natural cracks and crevices, and by abrading their walls, increase their size, so as to form C.; or they attack less indurated portions of the solid strata, and form cavities bounded by the harder rock. Such caverns are of frequent occurrence round the shores of Britain, and indicate, where they occur, an ancient sea-margin of the island. In limestone rocks, the destroying power of water is increased when it contains chemical agents which have the power of dissolving the substance of the rock, and so causing it to be carried off in solution by the water.

C. most frequently occur in limestone rocks. They especially abound in the oolitic limestone, which on this account was called by the earlier continental geologists "cavern limestone." The celebrated C. of Franconia in Germany, of Kentucky (q. v.) in America, that of Kirkdale in Yorkshire, and many others, occur in this formation. Next to limestone, the triassic measures, containing rock-salt, a material easily removed by water, most abound in caverns. They are also frequently met with in igneous rocks—the picturesque cave of Fingal, in Staffa, is formed in basalt; and in South America and Iceland the modern lava contains large caverns.

Many caverns have a calcareous incrustation lining their interior, giving them a gorgeous appearance. Sometimes this deposit is pure white, and has, when the cave is lighted up, a richness and transparency that cannot be imagined. It is, however, more generally colored by the impurities which the water has taken up from the superincumbent strata. To the incrustations which are suspended from the roof, like icicles, the name stalactite is given, while those rising from the floor are designated stalagmites. Sometimes the pendent stalactite is produced so as to meet the ascending stalagmite, and form pillars, as if to support the roof, as in the "Organ" in the Blue John Mine, Derbyshire. The source and origin of this deposit has been satisfactorily explained by Liebig as follows. The mould of the superficial soil, being acted upon by moisture and air, evolves carbonic acid, which is dissolved by rain. The rain-water thus impregnated, permeating the calcareous strata, has the power of taking up a portion of the lime, which it retains in a liquid condition, until from evaporation the excess of carbonic acid is parted with, when the lime again returns to its solid state, and forms the incrustation.

C. have an additional interest to the geologist, from the occurrence in many of osseous remains under the calcareous incrustations of the floor. The bones are imbedded in mud, and frequently concreted into a firm calcareous breccia. They belong to the Pleistocene period, when the C. in Europe were inhabited by large hyenas and bears. Portions of other animals inhabiting the neighborhood were dragged by them into their dens, to serve as food. In this way the bones of herbiverous and other animals are found mixed with those of the beasts of prey; they have a broken and gnawed appearance, similar to what is produced on recent bones by the teeth of a hyena. No less than 33 species of mammals and 5 species of birds have been discovered in the C. of the British Islands, of which about the half still survive in Europe, while the remainder are extinct. The mammals are species of ox, deer, horse, wolf, dog, hare, fox, weasel, water-rat, mole, bat, hippopotamus, and rhinoceros, besides the hyena and bear; and the birds are species of lark, partridge, pigeon, goose, and crow.

The most productive ossiferous cavern in Britain is that at Kirkdale, 25 miles from York, in which the remains of about 300 hyenas have been detected, besides innumerable gnawed bones of those animals on which they preyed. The carboniferous limestones of Glamorganshire abound in caves, which have been explored by Buckland, and more recently and thoroughly by Dr Falconer. At the meeting of the Geological Society in June 186), Dr Falconer thus describes the contents of one of them, called Bacon Hole. On the limestone floor of the cave are—(1.) a few inches of marine sand, abounding with *Litorina rudis. L. litoralis*, and *Clausilia nigricans*, with bones of an *Arvicola* and Birds; (2.) a thin layer of stalagmite; (3.) two feet of blackish sand, containing a mass of bones of *Elephas antiquus*, with remains of *Meles taxus* and *Putorius*; (4.) two feet of ochreous earth, limestone breccia, and sandy layers, with remains of *Elephas antiquus, Rhinoceros hemitœchus, Hyœna, Canislupus, Ursus spelœus, Bos*, and *Cervus*; (5.) irregular stalagmite; (6.) two feet of limestone breccia and stalagmite, with bones of *Ursus* and *Bos*; (7.) a foot or so of irregular stalagmite, with *Ursus*; and (8.) dark-colored superficial earth, kept sloppy by abundant drip, with bones of *Bos, Cervus, Canis vulpes*, horns of Rein-

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deer and Roebuck, together with shells of *Patella*, *Mytilus*, *Purpura*, and *Litorina* (probably brought into the cavern as food by birds), and also pieces of ancient British pottery. After a review of the Fauna of the bone caves of this country and of Europe, Dr Falconer concludes that the caves of Glamorganshire have probably been filled up with their mammalian remains since the deposition of the boulder-clay, and that there exist no mammalian remains in the ossiferous caves of England and Wales referrible to a fauna of a more ancient geological date. See KENT'S CAVERN.

Ossiferous C. occur in all parts of the globe. The fossils of those in Australia shew that the fauna of the Pleistocene period had a remarkable resemblance to that of the present day. The remains consist chiefly of kangaroos and allied genera of Marsupials.

CA'VIARE, the salted roses of the common sturgeon (*Accipenser Sturio*) and other fishes of the same genus. See STURGEON. It is chiefly prepared in Russia, where it is greatly esteemed as an article of food. It is also used to a considerable extent in Italy and France. The species of Sturgeon from the roes of which it is chiefly prepared, inhabit the Caspian and Black Seas and their tributary rivers. Among them are the Bielaga, or Great Sturgeon (*Accipenser Huso*,), the Osseter (*A. Guldenstadtii*), the Scherg or Sevruga (*A. stellatus*), and the Sterlet (*A. Ruthenus*). The C. made from the rose of the last named species is esteemed particularly delicious, and is reserved for the Russian court. Astrakhan is a principal seat of the preparation of caviare. More than 400,000 lbs. of C. have been prepared in the Caspian fishery in a single year.

CAVITÉ, a town of considerable importance on the island of Luzon, one of the Philippines. It is situated on the bay of Manila, ten miles south-south-west of the city of that name, of which it forms the quarantine station. It has a large cigar manufactory, is the chief naval dépôt of the Spanish possessions in the East, and gives name to a province with a population of 57,000. The population of the town itself is some 6000 or 7000.

CAVOR, or Cavon'r, a town of North Italy, situated at the foot of the Alps, 7 miles south-south-east of Pinerolo. It has manufactures of silk-twist, linens, leather, &c., and marble and slate quarries. Pop. 6000 or 7000.

CAVO RILIE'VO (Ital). In this peculiar kind of rilievo, which was extensively employed by Egyptian artists, the highest surface of the object represented is only on a level with the plane of the original stone, the rounded sides being cut into it. The effect resembles that of a concave seal. It is correctly described as *intaglio rilievato*. A wood-cut is given in Fairholt's "Dictionary of Terms in Art" of the Egyptian king Amunoph III. in hieroglyphics.

CAVOUR, Count Camilla Benso di, a distinguished Italian statesman of the 19th century, the descendant of a noble and wealthy family of Piedmont, was born at Turin, August 10, 1810. He was educated for a military career, but his liberal tendencies being likely to prove an insuperable barrier to his promotion, he retired during the stirring events of 1830—1831, and devoted himself to agriculture, in which he introduced great improvements. He was the first to use guano in Piedmont; and, at his instigation, a national agricultural society was formed. During a residence in England he made himself intimately acquainted with the political organization of the country, and also with its industrial institutions; knowledge of which he made good use on his return to his own country in 1842. In conjunction with Count Cesare Balbo, he in 1847 established a political daily journal in which he advocated the interests of the middle classes, a representative system somewhat after the pattern of the English constitution, as opposed alike to absolutism on the one hand, and mob rule on the other. On his suggestion the king was petitioned for a constitution, which was granted in February 1848. As a member of the Chamber of Deputies, during the stormy period which succeeded Charles Albert's declaration of war against Austria in March, C. strenuously opposed the ultra-democrats, and counselled an alliance with England as the surest guarantee for the success of the Italian arms. In the Marquis d'Azeglio's ministry, formed soon after the fatal battle of Novara, C. was successively Minister of Agriculture and Commerce, Minister of Marine, and Minister of Finance; and in 1852 he was appointed to succeed D'Azeglio as premier. From this time until his resignation in 1859, in consequence

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of the conclusion of the peace of Villafranca, C. was the originator as well as the director of the Sardinian policy. Taking upon himself at different times, in addition to the premiership, the duties of the Ministers of Finance, Commerce and Agriculture, and latterly of Home and Foreign Affairs, he greatly improved the financial condition of the country, introduced free trade, consolidated constitutionalism, weakened clerical influence, and made Sardinia a power of some account in Europe, by bringing her into alliance with England and France against Russia. The dispatches which C. penned in reply to those of Austria prior to the outbreak of the Italian war, are on all hands acknowledged as master pieces of astute diplomacy. In January 1860 C. was again called upon to preside over the Sardinian government, the duties of Foreign Minister likewise devolving upon him, and temporarily those of the Minister of the Interior also. He continued to direct the Sardinian policy until his death, June 1861.

CA'VY, (*Cavia*), a genus of quadrupeds of the order *Rodentia*, regarded as the type of a family, *Cavidæ*, differing from the Hare family (*Leporidæ*) in the complete want of clavicles, in the want of growing roots to the molar teeth, and in having the incisors situated as in other quadrupeds generally, and not in the peculiar manner so characteristic of the hares. There are four molar teeth in each jaw, and in the genus C. these are compound; and the genus is further characterised by four toes on each of the fore-feet, and three on each of the hind-feet, by the feet not being webbed, by the females having only two teats, and by the want of a tail. One species, *Cavia Cobaya*, has been long well known as a domesticated animal, and has been a common pet and plaything of children in Europe, almost from the time of the discovery of America. It is sometimes called the COMMON C. or RESTLESS C., but much more frequently receives the name of GUINEA-PIG, although it is neither nearly related to pigs, nor a native of Guinea. Perhaps *Guinea*, in this name, may be a corruption of *Guiana*, the cavies, and indeed the whole family of the *Cavidæ*, being exclusively South American. The colors which the domesticated C. exhibits have never been seen in any of the wild cavies of South America; and as it is known to have exhibited the same variations of color from about the time of its introduction into Europe, it is supposed to have been long domesticated by some of the South American tribes. The Guinea-pig multiplies with a rapidity exceeding that of any other known quadruped, producing young ones when only two months old, and afterwards at intervals of two months, and from four to twelve in a litter. This extraordinary fecundity is probably not so much the result of domestication, as a provision for the preservation of the race in a wild state, the little animal being very defenceless and destitute of means of escape, the ready prey of every carnivorous beast and bird.—The other species of C. much resemble the Guinea-pig. Some of them are very numerous in some parts of South America, and are sought for food, although no such use is made of the domesticated cavy. The Agouti (q. v.) and the Capybara (q. v.), are ranked among the *Cavidæ*.

CAWK, a popular name for a massive variety of the mineral called Heavy Spar or Sulphate of Baryta. See BARYTA.

CAWNPO'RE, a city of the Doab, on the right bank of the Ganges, about 140 miles above Allahabad, at the junction of the Jumna, being separated by the river from Oude, whose capital, Lucknow, lies 53 miles to the north-east. The lat. is 26° 29' n., and the lon. 80° 25' e. The stream in front, varying, according to the season, from 500 yards in width to more than a mile, presents a large and motley assemblage of steam-vessels and native craft. C., at least as a place of note, is of recent origin, being indebted for its growth, besides its commercial facilities, partly to military and political considerations. In 1777, being then an appendage of Oude, it was assigned by the nawab as the station of a subsidiary force; and in 1801 it became, in name as well as in fact, British property. Its cantonments, having accommodation for 7000 troops, have gradually accumulated about 50,000 native inhabitants; while the city itself contains a somewhat larger population of similar origin. During the mutiny of 1857, C. was the scene of Nana Sahib's massacre of his English captives. Though C. is only 879 feet above the sea, yet, during winter, considerable quantities of ice are made for preservation through the exposing of water by night in shallow vessels. Pop. (1872) of C. (spelt also *Khanpur*) 122,770.

CAWNPORE, the district of the above-described city, in the Lieutenant-govern-

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orship of the Northwest Provinces. Occupying the entire breadth of the Doab, it touches at once the Jumna and the Ganges; while to the eastward it has Futtehpore, and, to the westward, Etawah and Furruckabad. With a pop. in 1871 of 1,155,439, it has an area of 2363 square miles, stretching in lat. from 25° 55′ to 27° n., and in long. from 79° 34′ to 80° 37′ e. It is an alluvial plain of great fertility. The vine is cultivated, and indigo grows wild. Besides its two mighty rivers and their navigable tributaries, the Ganges Canal traverses the country for about 60 miles.

CAXAMA'RCA, or Cajamarca, a province in the north-west of Peru, with a capital of its own name. It is on the east side of the Andes, forming part of the basin of the Maranon. The province has 273,000 inhabitants, and the city about 20,000.

CAXAMARQUI'LLA, a town of North Peru, in the province of Libertad, one hundred miles east-north-east of Truxillo. Pop. about 8000.

CAXATA'MBO, or Cajatambo, a town of North Peru, in the province of Ancache, 120 miles n.n.e. of Lima, with a pop. of about 6000. There are silver-mines in the neighbourhood.

CAXTON, William, who introduced printing into England, was born in the Weald of Kent, about 1422. The particulars of the life of this great benefactor of his country are scanty. He was apprenticed in 1439 to Robert Large, a wealthy London mercer. At the death of the latter in 1441, he went to Bruges, where in 1462 or 1463 he seems to have become governor of a chartered association of English adventurers trading to foreign parts. In 1471 C. entered the service of Margaret, the Duchess of Burgundy, formerly an English princess, and apparently towards the end of 1476 he set up his wooden printing-press at the sign of the Red Pale in the Almonry at Westminster. The art of printing he had acquired during his sojourn in Bruges, doubtless from Colard Mansion, a well-known printer of that city; and in 1474 he put through the press the first book printed in the English tongue, the "Recuyell of the Historyes of Troye," a translation of Raoul le Fevre's work. The "Game and Playe of the Chesse" was another of C.'s earliest publications: but the "Dictes and Notable Wise Sayings of the Philosophers," published in 1477, is the first book which can with certainty be maintained to have been printed in England. All the eight founts of type from which C. printed may be called Black Letter. Of the ninety-nine known distinct productions of C.'s press, no less than thirty-eight survive in single copies or in fragments only. C., who was an accomplished linguist, and translated many of the works that issued from his press, was diligent in the exercise of his craft or in translation till within a few hours of his death, which seems to have happened about the close of the year 1491. In 1877 the printer and his work were fittingly commemorated by a typographical exhibition in London. See "The Old Printer and the New Press," by Charles Knight (1854); "Life and Typography of William C." (1861—1863), by W. Blades; and the "Biography and Typography of C." (1877), by the same author.

CAYENNE, a fortified seaport, capital of French Guiana, on the west point of an island of the same name at the mouth of the river Oyak. The roadstead is excellent, and the port commodious but shallow. C., though it is the entrepôt of all the trade of the colony, is chiefly known as a great French penal settlement. The island, 32 miles in circumference, is separated from the mainland by a narrow channel; its soil is fertile, but the climate is extremely unwholesome for Europeans, large numbers of the convicts having been carried off by malignant fevers. C. became a French colony about 1635; deportation hither began during the first French Revolution. Pop. about 8000.

CAYE'NNE CHE'RRY. See EUGENIA.

CAYENNE PEPPER consists of the powder of the dried pods, and more especially of the dried seeds of different species of CAPSICUM q. v.), particularly of *C. frutescens*.

CAY'MAN, a name somewhat variously used either as the distinctive appellation of some, or as a common name for all the *Crocodilidæ* of South America. See ALLIGATOR. The genus *Alligator* is by some naturalists of the present day divided into three genera, to one of which the name C. (*Caiman*) is appropriated, and of which the type is the species called the Eye-browed C. (*Alligator palpebrosus*), to which the name C. is distinctively applied in Surinam and Guiana, a species very

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abundant there, but not one of the largest or more dangerous of its tribe. It is remarkable for the three bony plates, separated by sutures only, which form each eyebrow or eyelid, projecting as large knobs like a man's fist; and this, and the scarcely webbed-feet, constitute the most important characters of the genus or sub-genus Cayman. To this sub-genus belong also *A. trigonatus*, regarded by Cuvier as a mere variety of the same species, and *A. gibbiceps*.

CAY'MANS—in English, *Alligators*—three low islets of the Caribbean Sea, which form a dependency of Jamaica, being 180 miles to the north-west of it. Discovered by Columbus, they were by him called Tortugas, from the abundance of turtle—still the staple production of the group. On an area of about 2000 acres, the population does not exceed 1500 or 1600. The soil yields corn and vegetables; and the people rear hogs and poultry.

CAZA'LLA DE LA SIE'RRA, a town of Spain, in the province of Seville, 39 miles north-east of the city of that name. It is situated on a declivity of the Sierre Morena; the district around is mountainous and well wooded, and abounds in minerals of various kinds, including iron, silver, copper, sulphur, and marble. The inhabitants, numbering between 7000 and 8000, are chiefly employed in smelting metals, manufacturing cannon, machinery, and agricultural implements. Some tanning, weaving, &c., are also carried on.

CAZE'MBÉ, or Kazembe, an important country of Africa, the limits of which have not been clearly determined, but its centre has been fixed at about lat. 12° s., and long. 31° e. The king's rule extends over a great portion of the established route across the continent of Africa, from the Congo up the valley of Luíua, and down the valley of Lúapúla. Vegetation is generally luxuriant. Its chief products are manioc, maize, salt, copper, iron, and ivory. The people are called Balonda or Balol.

CAZO'RLA, a town of Andalusia, Spain, 40 miles east-north-east of Jaen. C., which is a place of considerable antiquity, is pleasantly situated on a declivity, and is well watered by the Vega; has two old castles—one an Arab structure—manufactures of leather, earthenware, soap, and bricks, and a trade in agricultural produce. Pop. 7500.

CEANO'THUS. See RED ROOT.

CEARA, a province of Brazil, on the n. coast, situated in lat. 2° 40'—7° 25 s., long. 37° 40'—41° 30' w. It has an area of 42,600 sq. m., with (1872) 700,000 inhabitants. It abounds in balsams, gums, resins, and fruits; and among its minerals are gold, iron, copper, and salt. The *port* of C. had a trade with Great Britain in 1874 amounting to £967,584.

CEBADI'LLA. See SABADILLA.

CE'BUS (Gr. an ape or monkey), a genus of American monkeys, characterised by a round head and short muzzle, a facial angle of about 60°, long thumbs, and a long prehensile tail entirely covered with hair. The species are numerous, all of very lively disposition and gregarious habits, living in trees. They feed chiefly on fruits, but also on insects, worms, and molluska. They are included under the popular designation SAPAJOU in its wider sense, and some of them are the monkeys to which this name is sometimes more strictly appropriated. The names SAJOU and SAI are also given to some of them, and some are called Capuchin (q. v.) monkeys. One of the most common species in Guiana is the WEEPER MONKEY, or WEEPER SAPAJOU (*C. Apella*).—The name Capuchin is perhaps most frequently given to *C. Capuchinus*, a brownish species, with head, feet, and hands generally black, and front, shoulders, and cheeks whitish.—Some of the species of C. are adorned with beards.—The name *Cebidæ* is sometimes given to the American monkeys collectively, as a family or tribe. See MONKEY.

CECIDOMY'IA (Gr. *kekidion*, a gall-nut; and *myia*, a fly or gnat), a genus of dipterous (two-winged) insects of the family *Tipulariæ*—the gnat and mosquito family; having downy wings, which have three nervures, and are horizontal when at rest; antennæ as long as the body, with bead-like joints, and whirls of hairs at the joints; long legs, and the first joint of the tarsi very short. The species are numerous; nearly thirty are British. All are of small size, but some of them are very important on account of the ravages which their maggots effect in grain-crops. C.,

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cerealis, sometimes called the Barley Midge, a brownish-red fly with silvery wings of which the maggot is vermilion-colored, is often very destructive to crops of barley and spelt in Germany. The little maggots live in families between the stalk and the sheath of the leaf, abstracting the juice of the plant.—The WHEAT-FLY (q. v.) and the HESSIAN FLY (q. v.) belong to this genus.—Some of the species of C. deposit their eggs on the young buds of trees, which the larvæ transform into galls.

CECIL, William, Lord Burleigh, one of England's greatest statesmen, was born at Bourne, Lincolnshire, September 15, 1520. Educated at the grammar-schools of Grantham and Stamford, he thence passed to St John's College, Cambridge, where he was remarkable alike for his diligence and aptitude in learning. Entering Gray's Inn at the age of 21, he devoted himself assiduously to the study of law. History, genealogy, and theology also formed part of his studies at this time; and his knowledge of the last recommended him to the notice of Henry VIII., who presented him with the reversion of the *custos brevium*, an office of value in the Common Pleas. An alliance with the daughter of Sir Anthony Cook procured him the friendship of the Protector Somerset, who, in 1547, appointed him Master of Requests; and in the following year his great talents procured for him the office of secretary of state. He shared in the disgrace of Somerset, even to imprisonment for three months; but in less than two years after his release, his pre-eminent abilities secured for him a re-appointment to the state secretaryship by the Duke of Northumberland, his former patron's sworn enemy. During his second secretaryship, C. effected most important and beneficial changes in the commercial policy of the country. With a sagacity far beyond the spirit of his age, he endeavored to throw trade open, and did succeed in abolishing some monopolies: but others proved too strong for him, standing as he did alone, at a time when exclusive privileges were considered the only sureties of a profitable trade. When Queen Mary ascended the throne, C., being a Protestant, resigned his official employment, because he could not conscientiously serve a Roman Catholic court; but as a private gentleman he maintained good relations with the Roman Catholic party, and was one of the few eminent Protestants who escaped in purse and person during that short but infamous reign. His freedom from persecution has given rise to the charge, that he was a "trimmer" a very unjust accusation indeed. C. was naturally cautious and politic and averse to extremes in religion; but though he took no part in bitter sectarian discussions, he never belied his conscience, and to him is mainly owing the rejection of the bill which the Roman Catholics had introduced into parliament, with the view to a wholesale confiscation of the estates of Protestants. Prior to Mary's death, C., foreseeing her end, had entered into correspondence with Elizabeth, who, on her accession to the throne (November 16, 1558), at once recognising C.'s capacity for government, appointed him secretary of state. A biography of C. from this time until his death would be a forty years' history of England, for he was alike the originator and director of that policy which, hitherto, has made Elizabeth's reign memorable above that of any other English sovereign; for although Elizabeth occasionally, in her caprice, favored other courtiers, C. was the statesman whose judgment she relied on in all matters of consequence. His policy at home and abroad was at once shrewd and cautious, and also liberal and comprehensive, while he displayed a power of decision, ready and stern, when necessity demanded. As a statesman, C. was above animosities and favoritisms; his enemies never suffered, and his friends profited nothing, by his power. Capacity, truth, and honor were what he sought in public men. Had he been less just, history might have been more generous to his memory. The queen created him Baron Burleigh in 1571, and conferred on him the Order of the Garter in the succeeding year, when he was also made lord high treasurer, an office he held until his death, August 15, 1598.

CECIL, Robert, Earl of Salisbury, son of the above, was born about 1550. On the death of his father, having previously held important state offices, he succeeded to what would now be called the premiership. On the accession of James I., C., who had carried on a private correspondence with that monarch before Elizabeth's death, was confirmed in his office, and received many high honors, culminating in that of Earl of Salisbury. In 1608, he was made lord high treasurer, and the Exchequer was greatly improved in his hands. C. was a man of immense energy and far-reaching sagacity, undoubtedly the best minister the country had in

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his time; but he was cold, selfish, and unscrupulous as to the means he took to gain his ends, and get rid of his rivals. His connection with the disgrace of Essex and Raleigh laid him open to great and deserved odium, in the latter case especially. Like his father, however, he was free from the meanness and dishonesty of enriching himself out of the public money. He died May 24, 1612.

CECI'LIA, St, the patroness of music, is said to have suffered martyrdom in 230 A.D. Her heathen parents, as we are told, belonged to a noble Roman family, and betrothed their daughter, who had been converted to Christianity, to a heathen youth named Valerian. This youth and his brother Tiberius became Christian converts, and suffered martyrdom. C., when commanded to sacrifice to idols, firmly refused, and was condemned to death. Her persecutors, it is said, first threw her into a boiling bath, but on the following day they found her unhurt. The executioner next attempted to cut off her head, but found it impossible. Three days later, she died—rather a lame conclusion to such miraculous interference! As early as the 5th c., there is mention of a church dedicated to her at Rome; and in 821, by order of the Pope Paschal, her bones were deposited there. St C. is regarded as the inventor of the organ, and in the Roman Catholic Church her festival-day, November 22, is celebrated with splendid music. Chaucer, Dryden, and Pope have celebrated St C., and the painters Raphel, Domenichino, Dolce, and others have represented her in fine pictures.—Another St C. was born in Africa, and suffered martyrdom by starvation under Diocletian. The Roman Catholic Church celebrates her festival on the 11th of February.

CECRO'PIA, a genus of trees of the natural order *Artocarpaceæ*. *C. peltata*, a native of the West Indies and of South America, sometimes called trumpet-wood and snake-wood, is remarkable for its hollow stem and branches exhibiting merely membraneous partitions at the nodes. The small branches, these partitions being removed, are made into wind instruments. The wood is very light, readily takes fire by friction against a harder piece of wood, and is much used by the Indians for procuring fire in this way. The fruit is agreeable, and resembles a raspberry. Both the trunk and branches yield a large quantity of saline matter, which is employed by the French planters in the purification of sugar. The bark is strong and fibrous, and is much used for cordage. It is also astringent, and is applied in diarrhœa and other diseases.

CE'CROPS, the first king of Attica, figures in Greek mythology as an Autochthon (q. v.), half man and half dragon. Belonging, as he does, to the prehistoric ages of Greece, his real character can only be guessed at. Tradition declared him to be the founder of marriage, the author of the political division of Attica into twelve states, and the introducer of agriculture, of navigation, and commerce. He is also said to have civilized the religious rites of the people. The name C. is given to various towns in Greece, and the legends in general seem to indicate a Pelasgic origin for the hero. The later accounts, that he came from Sais in Egypt, have no historic basis.

CE'DAR, or Cedar of Le'banon, a tree much celebrated from the most ancient times for its beauty, its magnificence, and its longevity, as well as for the excellence and durability of its timber. It is often mentioned in Scripture; it supplied the wood-work of Solomon's temple; and in the poetry of the Old Testament it is a frequent emblem of prosperity, strength, and stability. It belongs to the natural order *Coniferæ*, and is the *Pinus Cedrus* of the older botanists; but is now ranked in the genus *Abies* (see FIR), in the genus *Larix* (see LARCH), by those who make *Larix* a distinct genus from *Abies*, or is made the type of a genus, *Cedrus*, distinguished from *Larix* by evergreen leaves and carpels separating from the axis, and receives the name of *C. Libani*.

Of the celebrated CEDARS OF LEBANON, only a few now remain. They consist of a grove of some 400 trees, about three-quarters of a mile in circumference, partly old trees, and partly young ones. Learned travellers think that most of the trees in the grove may be 200 years old, and several between the ages of 400 and 800 years. There are twelve trees whose age is incalculable—seven standing very near each other; three more a little further on, nearly in a line with them; and two not observed by any recent traveller except Lord Lindsay, on the northern edge of the

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grove. The largest of these two is 63 feet in circumference—following the sinuosities of the bark; one of the others measures 49 feet.

These trees are more remarkable for girth than stature, their height hardly exceeding 60 feet. Their age is variously estimated; the rules by which botanists determine the age of trees by are not applicable to them, for their stems have ceased to grow in regular concentric rings; they owe their prolonged existence to the superior vitality of a portion of their bark, which has survived the decay of the rest. Russeger is inclined to admit that these trees may possibly number some 2000 years.

The Arabs, of all creeds, have a traditional veneration for these trees; they believe that an evil fate would surely overtake any one who shall dare to lay sacrilegious hands on the *saints*, as they fondly call them. Every year, at the feast of the Transfiguration, the Maronites, Greeks, and Armenians mount to the cedars, and celebrate mass on a homely altar of stone at their feet.

The C. has been planted in parks in many parts of Europe; it was introduced into England in the latter part of the 17th c., and a tree at Sion House, London, is now eight feet in diameter at three feet above the ground. Even in Inverness-shire it succeeds so well that trees at Beaufort Castle, the seat of Lord Lovat, planted in 1783, are now three or four feet in diameter. On its native mountains the C. is found at the base of the highest peaks, at an altitude of about 8,000 feet above the sea. It seem to delight in a dry, open soil, where, however, its roots can have access to abundance of water. Although in foliage and some other particulars the C. considerably resembles the common larch, it differs in form and habit very widely both from the larch and from the pines in general. Its stem bears almost down to the ground irregularly placed branches, often of prodigious size and expanse, which divide irregularly into branchlets. The leaves are dark green, 10—15 lines long, pointed, united in clusters of 20—30; on the young shoots they are very numerous, and not in clusters; the small branchlets also are crowded together and pensile. The cones are erect, oval, broadly rounded at both ends, about four inches long, and three inches in diameter; their scales closely crowded, large and broad. The cones take two years to come to maturity, and hang on the tree for years before their scales come off and their seeds are set free. The wood of the trunk is reddish, and full of a fragrant resin. The ancients kept their writings in cabinets or boxes of cedar-wood. Extraordinary indestructibility and other virtues were ascribed to it. It is not nearly so much prized at the present day, because it is soft and light, and apt to crack in drying. This inferiority is, however, not improbably owing to the inferior age of the trees from which the timber is now procured. A *Cedar Resin*, or *Cedria*, flows spontaneously from the trunk of the C., or from incisions; it resembles mastic, and was anciently used along with other resins in the embalming of the dead. It was also used as a medicine. In very ancient times, C. OIL, a kind of turpentine, was prepared from the wood, and was spread on books in order to their better preservation. At the present day, the oil and the resin are scarcely known. The branches of the C. like those of the larch in warm countries, exude a sweet substance, which is known by the nam of C. MANNA.—The DEODAR, or HIMALAYAN C. (*Cedrus Deodara*), a tree held in great veneration by the Hindus, and of which the name is said to be properly *Devadara*, and to signify *god-tree*, is common in the Himalaya mountains, at elevations of 7000—12,000 feet, forming magnificent forests, and attaining a great size, a height sometimes of 150 feet, with a trunk 30 feet or more in circumference, an ample head, and spreading branches. It is described as having cones somewhat larger than those of the C. of Lebanon, the scales of the cones falling off as soon as the seed is ripe, and as differing from the C. of Lebanon also in more pensile branches and longer leaves; but Dr Hooker expresses a strong opinion that they will prove to be really the same species, as well as the C. of ALGIERS (*C. Atlantica* or *Africana*), which is found in the mountainous regions of the north of Africa. The wood of the deodar is resinous, fragrant, compact, and very durable. It is susceptible of a high polish, and in its polished state has been compared to brown agate. Owing to the abundance of resin, laths of it burn like candles. Its turpentine is very fluid, and although coarse, is much used in India for medical purposes; and tar and pitch are obtained from the trunk. The deodar has now become very common as an ornamental tree in Britain, although few specimens have yet attained a very consider-

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able size. On account of its extreme gracefulness when young, it is often planted in situations to which large trees are unsuitable, and is to be seen in many suburban parterres.—The name C. is often given to other coniferous trees besides the true cedars. Thus, the Siberian Stone Pine, or Cembra Pine, is called the SIBERIAN C. (see PINE), and a species of fir (*Abies religiosa*) is the RED C. of California (see FIR). A species of Cypress (q. v.) is known as WHITE C., and another as the C. of GOA. Several of the trees which bear the name C. are species of Juniper (q. v) among which are the VIRGINIAN C. or RED C. of North America, and the BERMUDA C.—which yield the cedar-wood used for pencils—the SPANISH C. of the south of Europe, &c. The name C. is even given to trees which have no resemblance to the true cedars, except in the resinous quality of the wood; thus the Cedar-wood of Guiana is produced by *Icica altissima*, a tree of the natural order *Amyridaceæ* (q. v.); the C. of the West Indies (see next article) belongs to the natural order *Cedrelaceæ*; and the name BASTARD C. is given in India to a tree of the natural order *Byttneriaceæ* (q. v.).

CEDAR, Barbadoes (*Cedrela odorata*), a tree of the natural order *Cedrelaceæ* (q. v.), and of the same genus with the toon of India, a native of the West Indies and warm parts of America. It is simply called Cedar in the West Indies. It is often upwards of eighty feet high, with a trunk remarkable for thickness. It has panicles of flowers resembling those of the hyacinth. The fruit, bark, and leaves have the smell of asafœtida, but the wood has an agreeable fragrance. Being soft and light, it is used for canoes, and for shingles. Havannah cigar-boxes are very generally made of it. In France, it is used in making black-lead pencils.

CEDAR BIRD. See WAXWING.

CEDAR MOUNTAINS, a range of the Cape Colony, parallel with the Atlantic, and nearly half-way between it and the dividing ridge of the country. They form the height of land between the Olifhant on the west, and the Great Thorn, its principal tributary, on the east, varying in altitude from 1600 feet to 5000. They lie about lat. 32° s., and long. 19° e., in the division of Clanwilliam, and supply the village of that name with cedar planks.

CE'DRATE. See CITRON.

CEDRELA'CEÆ, a natural order of exogenous plants, very nearly allied to *Meliaceæ* (q. v.), and chiefly distinguished by the winged seeds, numerous in each cell of the fruit, which is a capsule. The known species are few, all tropical or subtropical trees or shrubs, with pinnate leaves, most of them trees valuable for their timber. To this order belong mahogany, satin-wood, toon, Barbadoes cedar, the yellow-wood of New South Wales, &c. The barks of some species are febrifugal. That of *Soumida febrifuga*, the Rohuna or East Indian Mahogany, has been imported into Britain as a medicine.

CE'GLIE, a town in Southern Italy, province of Lecce, 18 miles north-east of Taranto. Pop. about 12,580. It produces much grain, and has fine pastures.

CEFALU', a town of Sicily, on the north coast, 47 miles east-south-east of Palermo. It is situated at the foot of a rock, and is surrounded by old walls. It has a cathedral, and the ruins of a Saracenic castle occupy a neighboring hill. As a seaport, it has little traffic. The inhabitants, numbering some 10,000, are chiefly engaged in fishing.

CEHEGI'N, a town of Spain, in the province of Murcia, 37 miles west-north-west of the city of that name. It has some spacious streets with handsome buildings, and manufactures of paper, cloth, and pottery. Pop. about 10,000.

CEILING (Fr. *ciel*; Lat. *cælum*, heaven). This term seems to have been suggested by the use of arched coverings for churches, and even for rooms, which prevailed in the middle ages, and was not unknown to the Romans. Whether the term was further suggested by the habit of tinting ceilings of a blue color, and decorating them with stars, or whether that usage arose from the use of the term already introduced, is more doubtful. Arched ceilings among the Romans were known by the name *cameræ* or *camera*, the Greek origin of which seems to furnish an argument in favor of the view that the arch was known to the latter people. The camera was formed by semicircular beams of wood, at small

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distances from each other, over which was placed a coating of lath and plaster. In later times the cameræ were frequently lined with plates of glass, whence they were termed *vitreæ*. But the ceilings most commonly in use amongst the Romans were flat, the beams, as in modern times, having been at first visible, and afterward covered with planks and plaster. Sometimes hollow spaces were left between the planks, which were frequently covered with gold and ivory, or paintings. The oldest flat C. in existence is believed to be that of Peterborough Cathedral. Like that at St. Albans Abbey, it is made of wood and plastered over like a modern ceiling. Ceilings of churches in the middle ages were generally painted and gilded in the most brilliant manner, and many existing ceilings still exhibit the traces of early decoration of this kind. The older ceilings generally follow the line of the timbers of the roof, which in the Early English and Decorated, are often arranged so as to give the shape of a barrel vault. In ceilings of this description there are seldom many ribs, often only a single one along the top. In the perpendicular style the C. often consists of a series of flat surfaces or cants, formed on the timbers of the roof. Though sometimes altogether destitute of ornament, they are more frequently enriched with ribs dividing them into square panels, with bosses (q. v.) or flowers at the intersections. Wooden ceilings are sometimes formed in imitation of stone groining, with ribs and bosses, examples of which will be found at York, Winchester, and Lincoln. In the Elizabethan age ceilings were generally of plaster, but they were ornamented with ribs having bosses or small pendants at the intersections. It is not unusual for the C. immediately over the altar, or the roodloft, to be richly ornamented, whilst the rest is plain.

CE'LANDINE (*Chelidonium*), a genus of plants of the natural order *Papaveraceæ* (the Poppy family), having a corolla of four petals, and a podlike capsule. The common C. (*C. majus*) is a perennial, with pinnate leaves, lobed leaflets, and yellow flowers in simple umbels, frequent under hedges, in waste places, &c., in Britain and most parts of Europe. It flowers from May to September. The root, stem, and leaves, when fresh, have a disagreeable smell, and are full of a yellow juice, which is very acrid, causing inflammation when applied to the skin. C. is sometimes used in medicine: it is a drastic purgative, and in large doses an active poison; in small doses it is said to act beneficially on the lymphatic system and on the organs of secretion, and to be useful in scrofulous diseases, disease of the mesenteric glands, &c. The fresh juice, applied externally to warts, corns, &c., removes them by stimulating them beyond what their languid vital powers can bear. Mixed with milk, it is applied to the eye for the cure of opacities of the cornea, but is a remedy that requires great caution in its use.

CELA'NO, Lake of. See FUCINO, LAKE OF.

CELASTRA'CEÆ. See SPINDLE-TREE.

CE'LEBÉS, a large island in the Eastern Archipelago, east of Borneo, between 5° 45′ s. lat.—1° 45′ n. lat., and 119°—126° e. long. Area, 37,485 sq. miles. It is irregular in shape, and four peninsulas springing from a common root form the large bays of Gorontalo and Tolo, and the gulf of Boni. C. is covered with mountains and valleys; a chain running throughout it sends spurs into the peninsulas. Some are active volcanoes, and earthquakes are frequent. The peak of Bonthaim is 9788 feet high. The island has a rich soil and extensive pastures. The vegetable kingdom gives sago, coco-nuts, bread-fruit, coffee, tamarinds, bananas, oranges, pine-apples, maize, rice, tobacco, sugar-cane, indigo, sandal-, sapan-, and ebony-wood. The animals include excellent horses, buffalo, cattle, wild swine, elands, goats, sheep, parrots, lories, birds of paradise, beautiful butterflies, wild bees, &c. The minerals are gold, iron, coal, and salt. The people spin and weave cottons. Pop., of various races, is reckoned at 3,000,000, of whom (1874) 568,336, including 2000 Europeans, are under Dutch rule. The chief town is Macassar, which names the strait between C. and Borneo. In Nov. 1874, a fire destroyed 774 houses of the town.

CE'LERY (*Apium*), a genus of plants of the natural order *Umbelliferæ*, distinguished by a mere rudimentary calyx, roundish entire petals, very short styles, and roundish fruit. The common C. (*A. graveolens*) is found wild in Britain and most parts of Europe, in ditches, brooks, &c., especially near the sea and in saline soils. Its leaves are dark green and smooth, its petals involute at the tip. The wild

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plant, also called SMALLAGE, has a stem about two feet high, a tapering slender root, a penetrating offensive odor, a bitterish acrid taste, and almost poisonous qualities. By cultivation, it is so much changed that its taste becomes agreeably sweetish and aromatic, whilst either the leaf-stalks much increase in thickness, or the roots swell in a turnip-like manner. These parts, blanched, are much used as a salad, or to impart flavor to soups, &c., and sometimes as a boiled vegetable. They contain sugar, mucilage, starch, and a substance resembling manna-sugar, which acts as a stimulant, particularly on the urino-genital organs, so that a very free and frequent indulgence in the use of C. cannot, in ordinary circumstances, be altogether favorable to health. Two principal varieties of C. are cultivated, that most common in Britain having long thick leaf-stalks, which are more or less tubular, sometimes almost solid, and, after blanching, either white or more or less tinged with red; whilst the other, called TURNIP-ROOTED C., or CELERIAC, is chiefly remarkable for its swollen turnip-like root, and is in most general cultivation on the continent of Europe. The "red" varieties of C. are esteemed rather more hardy than the "white." The blanching of the leaf-stalks is generally accomplished by drawing up earth to the plants, which are transplanted from the seed-bed into richly manured trenches; and as they grow, the trenches are filled up, and the earth finally raised into ridges, above which little more than the tops of the leaves appear. C. is thus obtained for use throughout the winter. In the northern parts of Britain, the seed is generally sown on a hotbed. C. seed is often used for flavoring, when the leaf-stalks cannot be obtained.—Another series of C. (*Apium australe*) grows abundantly in wet places on the shore about Cape Horn and in Staten Island. It is a large, hardy, and luxuriant plant, and is described as wholesome and very palatable, nearly equal in its wild state to our garden-celery. It seems well worthy of the attention of horticulturists.

CE'LESTINE, a mineral bearing the same relation to strontia (q. v.) that heavy spar bears to baryta. It is essentially sulphate of strontia ($SrOSO_3$), with occasional admixture of sulphate of baryta, carbonate of lime, oxide of iron, &c., in small proportions. It much resembles heavy spar, but is not quite equal to it in specific gravity; it is usually blue, often of a very beautiful indigo-blue; sometimes colorless, more rarely reddish or yellowish. Its crystallisation is rhombic, like that of heavy spar. Most beautiful specimens of crystallised C. are found in Sicily. C. derives its name from its color. It is used as a source of strontia.

CE'LESTINES, an order of hermits of St Damianus, founded by Peter de Morrone about 1264, and confirmed as a monkish order by Urban IV. in 1264 and 1274. They called themselves C. when their founder ascended the papal chair under the name of Celestine V. They are regarded as a branch of the great order of St Benedict, whose rule they follow; they wear a white garment with black hood and scapulary, and live a purely contemplative life. In the 18th and 14th centuries, the order rapidly spread through France, Italy, and Germany, but subsequently decayed. The French C. were secularised by order of Pope Pius VI. in 1776—1778; so also were the Neapolitan Celestines. In the present day, the order is almost extinct.

CE'LIBACY, from Lat. *cœlebs*, unmarried. Notwithstanding the divine commendation of marriage given in the Jewish Scriptures (Gen. i. 28), the opinion had become prevalent, even before the time of Christ, that C. was favorable to an intimate union with God. This notion took its origin in the wide-spread philosophy of a good and an evil principle. The body, consisting of matter, the seat of evil, was looked upon as the prison of the pure soul, which was thought to be defiled by bodily enjoyments. Among the Jewish sect of the Essenes, accordingly, a life of C. was held to be the chief road to sanctity. These ascetic views naturally led, in the first place, to the disapproval of second marriages. While, therefore, in the first Christian churches, every one was left at liberty to marry or not as he thought fit, the objection to those who married a second time had become so generally spread, that the Apostle Paul saw occasion to counsel such Christian converts as were in widowhood to remain so.

By the 2d c., however, the unmarried life generally had begun to be extolled, and to be held necessary for a life of sanctity, although several, at least, of the apostles themselves had been married. Two passages of Scripture (1 Cor. vii. and Rev. xiv. 4) were specially cited as proving that C. was the genuine condition of a Christian;

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and with the platonising Fathers of the 2d and 3d centuries, the unmarried of both sexes were held as standing higher than the married. Accordingly, although there was no express law against the marriage of the clergy, many, especially of the bishops, remained unmarried; a second marriage was, in their case, already strictly prohibited.

As the bishops of Rome rose in consideration, and gradually developed a firmer church government, they called upon all who belonged to the clerical order to live for the church alone, and not marry. This requirement met with constant resistance; still, it became more and more the custom, in the 4th c., for the higher clergy to refrain from marriage, and from them it went over to the lower orders and to the monks. Provincial synods now began expressly to interdict the clergy from marrying. The council of Tours (566) suspended for a year all secular priests and deacons who were found with their wives; and the Emperor Justinian by an edict declared all children born to a clergyman, after ordination, to be illegitimate, and incapable of inheritance. There were still, however, many married priests, who resisted the law, and found encouragement in the opposition which the Greek Church made to that of Rome in this matter of celibacy. The council held at Constantinople in 692, declared, in opposition to the Church of Rome, that priests and deacons might live with their wives as the laity do, according to the ancient custom and ordinance of the apostles. The orthodox Greek Church has continued to adhere to this decision. Priests and deacons in that church may marry before ordination, and live in marriage after it; but they are not allowed to marry a second time. However, only a priest living in C. can be chosen as bishop or patriarch.

The Church of Rome, continued its endeavors to enforce the law of C.; though, for several centuries, they were attended with only partial success. There still continued to be numbers of priests with wives, although the councils were always issuing new orders against them. Popes Leo IX. (1048—1054) and Nicholas II. (1058—1061) interdicted all priests that had wives or concubines from the exercise of any spiritual function, on pain of excommunication. Alexander II. (1061—1073) decreed excommunication against all who should attend a mass celebrated by a priest having a wife or concubine. This decision was renewed by Gregory VII. in a council held at Rome in 1074, and a decretal was issued that every layman who should receive the communion from the hands of a married priest should be excommunicated, and that every priest who married or lived in concubinage, should be deposed. The decree met with the most violent opposition in all countries; but Gregory succeeded in carrying it out with the greatest rigor; and though individual instances of married priests were still to be found in the 12th and 13th centuries, the C. of the Roman Catholic clergy was established, and has since continued both in theory and practice.

The violence thus done to human nature did not fail to avenge itself in those rude times. The licentiousness and corruption of the priests and monks became in many cases boundless, and it was in vain that many individuals as well as councils, strove against it. The immorality and debasement of the clergy became a reproach and by-word in the mouth of the people, and gave a powerful impulse to the religious movement that began in the 16th century. The leading reformers declared against the C. of the clergy as unfounded in Scripture, and contrary to the natural ordinance of God, and Luther set the example of marrying. This was not without effect on the Roman Catholic clergy, and the question of the abolition of C. was raised at the council of Trent (1563). But the majority of voices decided that God would not withhold the gift of chastity from those that rightly prayed for it, and the rule of C. was thus finally and forever imposed on the ministers of the Roman Catholic Church. Those who have only received the lower kinds of consecration may marry on resigning their office. For all grades above a subdeacon, a papal dispensation is necessary. A priest that marries incurs excommunication, and is incapable of any spiritual function. If a married man wishes to become a priest, he receives consecration only on condition that he separate from his wife, and that she of her free will consent to the separation and enter a religious order, or take the vow of chastity. The priests of the united Græco-Catholic congregations in Rome have received permission from the popes to continue in marriage, if entered into before consecration, but on condition of always living apart from their wives three days before they celebrate mass.

Notwithstanding these decisions, the contest against clerical C. has again and

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again been resumed, in recent times, both within and without the Roman Catholic Church. In fact, all attempts at innovation within the bosom of Catholicism, connect themselves with the attack on C., the abolition of which would deeply affect the constitution and position of that church. So far back as 1817, the Catholic Faculty of Tübingen expressed the opinion that compulsory C. was one of the chief causes of the want of Catholic ministers. In 1826, the Catholic clergy of Silesia put in petitions to the bishop for the abolition of C.; and unions were afterwards formed in Baden, Würtemberg, Bavaria, Silesia, and Rhenish Prussia, which, along with alterations in the doctrines and ritual of the Romish Church, combined attacks on the prohibition of marriage to the clergy. A work was also published, entitled "The Introduction of Compulsory Celibacy among the Christian Priesthood, and its Consequences." (Altenb. 1828, new ed. 1845), which excited great attention. At last the abolition of the law came to be discussed in the legislatures of Baden, Saxony, and other countries. The church claimed this subject as belonging exclusively to her jurisdiction, and not to that of the state; and in Würtemberg the clergy induced the government to suppress the anti-celibacy society; but this only made their opponents in the press the more zealous. In France, also, the question, about 1829, was eagerly discussed. And in Spain, the Academy of Ecclesiastical Science took the subject into consideration in a meeting held in 1842; while the Portuguese Chambers had previously, in 1835, discussed it, though without result. The same took place in Brazil, about 1827.

During the commotions of 1848, the subject was again brought into prominence in Germany. The German Catholics (q. v.) had already abolished C.; and a general measure was called for in the Frankfort parliament, in the Prussian Assembly, and in the press. In Austria, also, voices were raised against it; but here the state took the side of the pope, who, in a bull of 1847, had added fresh stringency to the rule of C., and condemned its infringement. See BACHELOR.

CELL, (Lat. *cella*, from *celo*, to conceal). The Latin word had nearly all the significations which we attach to the English one, and a good many besides which we have not borrowed. For example, the whole space within the walls of an ancient temple was called the *cella*. But the interior was frequently divided into several cellæ, in which case each C. took the name of the deity whose statue it contained, and was called the C. of Jupiter, Juno, Minerva, and the like. In these cases, the word approached to its general meaning, which, with the Romans as with us, was that of a store-room, or small apartment where objects of any kind were stowed away. In modern architecture, the term Vaulting C. signifies the hollow space between the principal ribs of a vaulted roof.

CE'LLÉ, or Zell, a town of Hanover, on the left bank of the Aller, which at this point becomes navigable, 23 miles north-east of the city of Hanover. It is situated in the midst of a sandy plain, well built, and has a palace with a garden, in which Matilda, sister of George III., is buried. Pop. (1871) 16,147. The inhabitants are very industrious. The chief manufactures are linen, hosiery, tobacco, wafers, soap, &c. An active commerce is also carried on by the Aller, and by railway.

CELLI'NI, Benvenu'to, a celebrated Italian gold-worker, sculptor, founder, and medalleur, remarkable not only for his skill as an artist, but also for his checkered life, was born at Florence in the year 1500, and first displayed skill as a chaser and gold-worker. His autobiography is a remarkably curious and interesting work, presenting us with a complete picture of the author's life and character; his activity, his extraordinary weaknesses, the impetuosity of his passions, the perilous circumstances in which his quarrelsome disposition placed him (for C. thought nothing of committing manslaughter in a moment of rage), and the ludicrous vanity and credulity which are never absent from him. The book is also of great value in a historico-social point of view, but does not impress us favorably in regard either to the personal or social morals of the times.

At an early period, having been banished from Florence in consequence of an "affray," C. went to Rome, where he was employed by many distinguished patrons of art, but afterwards was allowed to return to Florence. Another "affray" compelled him to flee to Rome a second time, where he secured the favor of Clement VII. C., by his own account, was as great in arms as in art; he declares that it was himself who killed the Constable Bourbon and the Prince of Orange at the siege of

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Rome. His reckless conduct for some years compelled his constant shifting between Rome and Florence, Mantua, and Naples. In 1537 he went to the court of France, where he was very honorably received. Illness, however, induced him to return yet once more to Rome, where he had the misfortune to be imprisoned on a charge of plundering the treasures in the castle of St. Angelo during the siege of Rome. At length he was liberated, through the intercession of the Cardinal of Ferrara, for whom he executed, out of gratitude, a fine cup, and various other works. He now accompanied his deliverer to France, and entered the service of Francis I.; but having incurred the displeasure of the ruling favorite, Madame d'Estampes, he returned to Florence —not, however, until, as usual, he had settled some matters with his "sword"— where, under the patronage of Cosmo de' Medici, he executed several fine works in metal and marble—among them, the celebrated bronze group of "Perseus with the Head of Medusa," now in the market-place in Florence. Among other preserved works of C., the splendid shield in Windsor Castle may be noticed. In his 58th year, he began to write his autobiography, and died in 1570 or 1572. In 1876, a number of C.'s original papers were found.

CELLS, in Physiology.—I. ANIMAL CELLS.—On examining, under a high magnifying power, any of the constituents of the animal body, we perceive that the smallest parts which appear to the naked eye as fibres, tubes, &c, are not ultimate elements in respect to form (morphotic elements), but that they contain and are built up of certain extremely minute particles, which differ in different organs, but always have a similar appearance in the same organs. By far the most important of these microscopic forms, which are known by histologists as "simple elementary parts," are the C., which not only form the starting-point of every animal and vegetable organism (the ovum in either kingdom of nature being simply a cell), but also—either as C., or after having undergone certain modifications which will be presently described—make up the tissues and organs of the perfect animal. Indeed, some of the lowest plants (red snow, gory dew), and of the simplest forms of animal life (GREGORINÆ, &c., q. v.), appear to consist of a single cell.

While in plants the elementary parts generally unite directly with one another, in animals they are usually combined by an intersititial substance, which may be either solid or fluid, and is always derived from the blood or general nutrient fluid. If this interstitial substance take a part in the formation of the C., it is called a cytoblastema or a blastema, from *kutos*, a cell or vesicle, and *blastema*, germ-substance; if it has nothing to do with their maintenance, it is called the matrix. The cytoblastema is usually fluid, as in the blood, chyle, &c.; while the matrix is solid, as in cartilage, bone, &c.

In every cell, we can distinguish, if we use sufficiently high magnifying powers, a membranous envelope, known as the cell-wall or membrane, and certain contents. The latter are fluid or gelatinous, and besides containing particles or granules, usually exhibit a peculiar rounded body, the nucleus; which, again contains in its interior a fluid and a still smaller corpuscle, the nucleolus.

The fundamental form of the cell is spherical or lenticular; it is such in all young C., and is persistent in those which occur in fluids, as, for example, the blood-corpuscles. Amongst other well-known forms may be mentioned: the polygonal, as in pavement epithelium, or pigment of the eye; the conical or pyrimidal, as in ciliated epithelium; the cylindrical, as in cylinder epithelium; the fusiform, or spindle-shaped, as in contractile fibre-C.; the squamous, as epidemeric scales; and the caudate, polar or stellate, as the C. in the gray nervous tissue.

With regard to size, the largest animal C.—excepting the unicellular organisms —are the yolk-C. of the ova of birds and amphibia, while the blood-C. of certain animals may be taken as representing the smallest cells. Average C. range from 0·005 to 0·01 of a line in diameter.

The cell-membrane is usually transparent and colorless, mostly smooth, and so thin as to exhibit only a single contour, rarely of any measurable thickness. No traces of structure can be detected in it. The granular appearance which the membrane occasionally presents, is due to projections depending on granules lying on the inside; and it vanishes on the addition of water, which causes the cell to be distended by endosmosis. See OSMOTIC ACTION.

C. which contain only fluid are rare (fat-C., blood-C.); generally, besides fluid, they contain elementary granules and vesicles, and sometimes crystals. As a ger-

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eral rule, the number of these morphotic elements increases with the age of the cell; sometimes, however, this is not apparent, in consequence of their being grouped in a single mass around the nucleus.

The nucleus is usually spherical or lenticular, transparent, and either colorless or yellowish, and ranges from 0·002 to 0·004 of a line in diameter. All nuclei are vesicles, as was originally maintained, in 1841, by Schwann ("Microscopical Researches into the Accordance in the Structure and Growth of Animals and Plants," Sydenham Society's translation, 1847, p. 173), who must be regarded as the founder of the cell-theory in its relation to animal tissues, and as has since been confirmed by Kölliker and other later observers. The contents of the nucleus usually consist, with the exception of the nucleolus, of a limpid or slightly yellowish fluid, from which water and acetic acid precipitate granular matter. In general, only one nucleus exists in each cell, except when it is multiplying (a process which we shall presently explain); occasionally, however, we meet with several nuclei—four, ten, or even twenty.

The nucleolus is round, sharply defined, and often so small as to be almost immeasurable. Nucleoli are found in most nuclei so long as the latter are still young, and in many during their whole existence. As, however, nuclei exist in which no nucleolus can be detected, we cannot regard the nucleolus as so essential an element of the cell as the nucleus. Most commonly a nucleus contains only one nucleolus; two are not unfrequently seen; more are rare.

Our knowledge of the chemical composition of C. is very imperfect. That the cell-membrane is a protein substance (q. v.)—at all events in young C.—is obvious from its solubility in acetic acid and in dilute caustic alkalies; and the membrane of the nucleus seems to have a similar composition; while there are chemical reasons for believing that the nucleolus is composed of fat. In the contents of most C. we usually find such substances as occur in solution in the cytoblastema—viz., water, albumen, fat, extractive matters, and salts; and in the C. of secreting organs, as, for instance, the liver and kidneys, we find the special secretions of those glands; in the blood-C., we find hæmato-crystalline, &c.

There are two perfectly distinct ways in which C. can be generated: they may be developed independently of other C. in a plastic fluid (the cytoblastema); or they may be developed from pre-existing C. by cell-multiplication, the existing C. either producing secondary C. within themselves, or multiplying by division. In both these latter kinds of cell-development, the nucleus seems to be the centre of development of the young cells.

In order that free or independent cell-development shall take place, we must have a cytoblastema containing protein substances (probably fibrin), fat, and certain salts (especially phosphates) in solution; and very possibly the presence of the particles of pre-existing C. may also be necessary, in which case free cell-development ceases to exist. The chyle and lymph corpuscles may be mentioned as examples of this mode of cell-formation. The steps of the process are not very clearly made out, but we know that the nuclei are first formed, and that the cell-membranes are developed around them. Free cell-development is far less common in man and the higher animals than cell-multiplication, and, we believe, never occurs in the vegetable kingdom. All pathological cell-formations—the C. in pus (q. v.), and in other morbid exudations—come, however, under this head.

The development of C. within other C. is of very common occurrence. An original or parent cell produces two or more secondary or daughter C., and the process of formation is said to be endogenous. Cartilage-C. afford a good example of this process. The nucleus and the contents of each parent cell undergo division into two parts, so that the number of C. is successively doubled. The mode in which the multiplication of the nucleus takes places cannot be definitely made out in all cases, but when clear observation is possible, the nucleoli first divide into two, and then separate.

A multiplication of C. by division has been proved to take place in the red blood-C. of the embryos of birds and mammals, and in the first colorless blood-C. of the tadpole, and very probably occurs extensively in many embryonic and adult tissues, in which a self-multiplication of C. is certain, but where no parent C. with secondary C. can be detected. In some cases we have an elongation of the cell, and the single nucleus becomes divided into two: the cell then suffers constriction in the middle, which proceeds till it finally separates into two parts, each of which con-

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tains a nucleus. This variety of cell-formation affords a good illustration of the doubt and difficulty connected with this class of investigations. It was altogether unknown to Schwann when he published his great work in 1839, and was first noticed and described by Remak in 1841, who, however, subsequently retracted his published view, and did not again advocate it till Kölliker confirmed his observation, and declared it to be correct.

No satisfactory theory has been propounded with the view of explaining the development of cells. Schwann compares the formation of C. with that of crystals, but it must be recollected that the molecular attraction concerned in the formation of C. is so far peculiar, that—1. It never produces geometrical solids, but even in the nucleus and nucleolus determines a globular form; 2. That it aggregates not homogeneous, but chemically different substances; and 3. That the final result of its action—namely, the cell—is extremely limited in size, while a crystal may be of a comparatively indefinite magnitude.

The growth of C. requires some notice. Growth probably occurs in all C., although not in all to the same extent. It is most obvious in those which are formed directly round a nucleus, since in these the membranes which at first closely invest the nucleus, in time become distended and enlarged, and merely remain in contact with the nucleus at one point. Growth may take place either in surface or in thickness. The former is most commonly general—viz., in all those cases where C. increases without altering their form; but is sometimes partial—viz., in those cases in which the cell deviates considerably from the primary globular form. The latter occurs to a certain degree in all C., but in some kinds to a far greater extent than in others. The nuclei and nucleoli also take part to a certain extent in the growth of the cells. Schwann gives the following general explanation of the process of growth. He considers that the molecules of the cell membrane exert an attractive influence on the fluid which surrounds them, and deposit its newly formed particles amongst themselves. If the deposition take place between the molecules already present in the substance of the membrane, the cell becomes distended; if it take place only in one or more definite directions, the membrane becomes thickened.

Having now traced the cell to the period of its full growth, we are prepared to consider the processes which occur in the interior of this minute organic structure, or, in other words, the physiology of cells. To enter satisfactorily into this subject, we ought to have an exact knowledge of the chemical composition of the contents of different cells. All that we know of the contents of C. generally is, as we have already stated, that they usually consist of a moderately concentrated solution of protein matters, with alkaline and earthy salts, and dissolved or suspended fat-particles; and that besides these ingredients many C. contain either a great preponderance of one of these constituents, to the almost entire exclusion of others, or are found to contain altogether new substances. Thus, there are C. with much protein matters, as the nerve-C., and with much fat, like the fat-C.; while there are other C. which specially contain hæmatine (the red coloring matter of the blood), pigment, biliary and urinary constituents, mucus, milk, sugar, &c.

The main cell-processes occurring in these variously constituted C. are absorption, secretion, and excretion. These depend principally, if not entirely, upon chemical and physical laws, and are to a great extent amenable to micro-chemical observation.

Absorption, or the appropriation of matters from without, is most manifest in those C. which at first have little or no contents save the nucleus. Although endosmose must be taken into account as a condition of absorption, C. must not be regarded merely as vesicles provided with indifferent porous membranes; for the filling of C. does not take place by their admitting every kind of matter indiscriminately; but they have the power of taking up one constituent, and rejecting another, and thus exhibit a selective faculty.

The cell having thus become filled from without, we have next to inquire into the changes which take place in the membrane and in the contents. As regards the former, the membranes of most C. not only become denser and more solid with age, but they undergo changes in their chemical constitution. Thus, in the horny tissues, the young C. are easily soluble in alkalies and acids, while older C. of the same nature are scarcely affected by these re-agents; again, in cartilage-C., the membrane not only becomes firmer with age, and thickens as ossification proceeds, but

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is changed into a tissue yielding gelatine or glue on boiling, which subsequently becomes impregnated with salts of lime (phosphate and carbonate). See BONE.

The function of secretion is mainly carried on by changes in the contents of the cells. Thus, mucus is formed in the epithelial C. of the mucous membranes, pepsin in those of the gastric glands, bile in the C. of the liver, and sepia in the C. of the ink-bag of the cuttle-fish. In these cases, the C. do not separate mucus, pepsin, &c., from the blood, but merely the materials from which they elaborate these substances. In other cases, as, for instance, in the C. of the kidney, the function of these minute organisms is not to manufacture new products, but merely to separate certain substances (urea, uric acid, &c.) from the blood, which, if not immediately removed from the general circulation, would speedily accumulate, and act as a deadly poison. That these C. merely separate the urea from the blood, and do not form it in their interior, is proved by the fact that, if the kidneys of an animal are extirpated, the urea and other urinary constituents may speedily be found in large quantity in the blood.

Excretion takes place by the bursting or solution of the distended secreting cell, usually into the duct of a secreting gland. The reader who desires further information on the functions of the C. in relation to secretion and excretion, is especially referred to an admirable memoir by Professor Goodsir, "On Secreting Structures," published in John and Harry D. S. Goodsir's "Anatomical and Pathological Researches, 1845."

In conclusion, we must notice the metamorphoses of cells. The ovum itself is, as we have already mentioned, merely a nucleated cell; after impregnation, a number of secondary C. are formed within it, by a process of cleavage or segmentation. See articles GENERATION and OVUM. Some of the C. which occur in the ovum in its early stages soon coalesce with others to form the higher elementary parts, which we shall shortly enumerate; others, without entering into combinations, more or less change their previous nature, as the horny plates of the epidermis and nails; while others, again, undergo no change of form throughout the period of their existence.

The permanent C. are arranged by Kölliker ("Manual of Human Histology," translated by Busk and Huxley, 1853, vol. i. p. 47) under the following heads:

1. *True Cells*, which have in no essential respect altered their cellular character. These occur in the epidermis and the epithelium; in the blood, chyle, and lymph; in the glandular secretions, in the fatty tissue, in the gray nervous substance, in the glands (liver, spleen, &c.), and the cartilages. Their varieties of form and contents have been already noticed. Regarding their modes of occurrence, some are either isolated in fluids or in solid tissues; others are united by apposition, without any intervening structure, into a cellular parenchyma; while others, again, are conjoined by an intercellular substance of some kind.

2. *Metamorphosed Cells.* To these belong—*The horny scales:* flattened, polygonal, or fusiform; their membrane being fused into one mass with their contents. They occur in the epidermis, the laminated pavement-epithelium, and the hair and nails. The *contractile fibre-C.:* fusiform, slightly flattened, considerably elongated C., whose membrane, with its soft, solid contents, is changed into a contractile substance. They occur in the smooth or involuntary muscles. *The tubuces of the crystalline lens of the eye:* very elongated C., with viscid, albuminous contents. *The prisms of the enamel of the teeth:* greatly elongated, prismatic, and strongly calcified cells. *The bone-C.:* thickened C. (with *canaliculi*, or minute branching canals) which have coalesced with the matrix of the bones. *The transversely striated muscular C.:* large polygonal C. whose contents have become metamorphosed into a transversely striated or striped tissue, such as is found in voluntary muscular fibre. From these C. are formed all the different fibres, net-works, membranes, tubes, &c.; in short, all the higher elementary parts of which the animal body is composed.

For further information on C. and cell development, the reader is referred, in addition to the works quoted in this article, to Leydig, "Lehrbuch der Histologie des Menschen und der Thiere," 1857; and to Frey, "Histologie und Histochemie des Menschen," 1859; while he will find full details on morbid cell development (the development and growth of C. in tubercle, cancer, and other morbid deposits) in Vogel's "Pathological Anatomy of the Human Body," translated by Day, 1847;

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and in Wedl's "Pathological Histology," translated (for the Sydenham Society) by Busk, 1855.

II. VEGETABLE CELLS.—In the vegetable, as in the animal kingdom, the primary form of the cell is that of a sphere. There are, however, interfering influences, which usually alter or modify the primary form, of which the most important are, (1.) Special directions assumed in the development, in obedience to a law regulating the structure of the tissue in which the cell occurs; and (2.) Obstructions to the expansion of the cell in certain directions from the pressure of surrounding cells.

The most common forms referrible to the law of development are, (1.) The *spherical* or fundamental form; (2.) The *cylindrical*, in which there is a tendency to elongation in the direction of a vertical axis; and (3.) The *tubular*, in which there is an excess of development in the direction of the two transverse axes.

The secondary modifications of these forms are numerous. Thus, in lax tissues, the spherical form may become an irregular spheroid, running out into *lobed*, and even *stellate* forms, as may be seen in the pith of rushes and the stems of various aquatic plants. Again in seeds, the hard part of fruits, &c., the mutual pressure of the C. converts the spherical into *polyhedral* forms, of which the *dodecahedron*—giving a hexagonal section, and arising from equal pressure in all directions—is the most common, although *cubic* and many other forms occasionally occur.

The magnitude of the vegetable C. is very varied. In flax, the liber-cells have been found ¼, or even ⅓ of an inch in length, and the cylindrical C. of some of the Confervæ are more than an inch long—although their transverse diameter is very minute—whilst, on the other hand, the spores of Fungi are C. of a diameter of $\frac{1}{1000}$ of an inch. The average diameter of the C. in the parenchymatous tissues is about $\frac{1}{400}$ of an inch.

Both the cell-wall and the contents differ from the corresponding parts in animal cells. In all young C. the wall is membranous, freely permeable by water, elastic, and flexible. In many cases it retains these properties, whilst in others it becomes much modified, as the cell grows older. It consists mainly of CELLULOSE (q. v.). As the vital and chemical phenomena exhibited by plants depend primarily upon operations in the interior of the cell, the careful study of the cell contents is of the highest importance. Of these contents the most important are the *primordial utricle*, with the *protoplasm*, the *nucleus*, *chlorophyll*, *corpuscles* and *starch granules*.

The primordial utricle is a layer of substance of mucilaginous consistence (colored yellow by iodine), lining the entire wall of the young cell, but often disappearing at a comparatively early period. The protoplasm is a tough mucilaginous and frequently granular fluid, which fills up the space in the interior of the cell not occupied by the nucleus. The nucleus or cytoblast is a globular or lenticular body, identical in its character with the substance of the primordial utricle, and occurring in the protoplasm of most young cells. Little is known with certainty regarding the chlorophyll corpuscles, except that, under the influence of solar light, green coloring matter is developed from them. Of the starch granules, which are very commonly found in the cell contents, we need not speak, as they are sufficiently described in the article STARCH.

In addition to the above organised structures, we must mention as frequent constituents of the cell contents, fluid coloring matters, essential and fixed oils, resins, sugar, dextrine, gum, alkaloids, and mineral or organic salts, which are not unfrequently found in a crystalline form, when they are termed raphides.

There are two modes of cell-development in the vegetable kingdom—viz. (1.) *Cell-division*, where two or more new cells fill the cavity of the parent cell, and adhere to its membranes, appearing to divide it into compartments; and (2.) *Free cell-formation*—not to be confounded with a process of the same name which is supposed to occur in the animal kingdom—in which the whole or part of the cell-contents become detached from the cell-wall and resolved into new loose C., which ultimately escape from the parent cell. The former mode universally occurs in the formation of the C. by which growth is effected; the latter occurs only in the production of C. connected with reproduction. For further information, we must refer the reader to Von Mohl's "Principles of the Anatomy and Physiology of the Vegetable Cell," translated by Henfrey, London, 1852.

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Cellular Cult

CE'LLULAR TISSUE. This is the old term for a widely diffused animal texture, which has also received the names of areolar, reticular, filamentous, and connective tissue. If we make a cut through the skin, and proceed to raise it, we see that it is loosely connected with the subjacent parts by a soft, filamentous, elastic substance, which, when free from fat, has a white fleecy aspect. This is the tissue in question. It is also found underneath the serous and mucous membranes which are spread over internal surfaces, and serves to attach these membranes to the parts which they line. We likewise find it lying between the muscles, the blood-vessels, nerves, &c., occupying the interspaces between the different organs, and often investing each of them with a special sheath. While it thus connects and insulates entire organs, it at the same time performs a similar function in regard to the minute parts of which each organ is made up. Thus, for instance, in muscular tissue, it enters between the fibres of the muscle, uniting them into bundles; and similarly, it enters into glands, &c. This is termed *penetrating* or *parenchymal* cellular tissue.

It is not only one of the most general and most extensively distributed of the tissues, but it is continuous through the whole organism, and may be traced without interruption from any one region of the body to any other. It is in consequence of this continuity that dropsical fluids, air, &c., effused into the C. T., may spread far from the spot where they were first introduced.

On examining a fragment of this tissue, when stretched out, we see with the naked eye that it presents the appearance of a multitude of fine, soft, colorless, elastic threads, like spun glass; intermixed with these are delicate films or laminæ, crossing one another in all directions, and leaving open spaces, or areolæ; hence the name of areolar tissue.

A small quantity of colorless transparent fluid is always present in this tissue; when abnormally increased, it gives rise to the form of general dropsy known as anasarca. The microscopic character of C. T. are briefly noticed in the articles TISSUES, ANIMAL.

CELLULAR TISSUE, in Botany, is any vegetable tissue formed of cohering cells alone, and in which there are no vessels. It is often called *parenchyma* (Gr. something spread out), although an attempt has been made to restrict that term to one kind of it, with cells of a particular form, and terms of Greek derivation have been multiplied for other kinds. The cells of C. T. vary much, both in form and size (see CELLS); but particular forms and sizes are characteristic of particular kinds or particular parts of plants. The products of the vital activity of plants are formed in the interior of cells, or by secretion from the inner side of their walls. Vessels being formed from cells, it is not easy to fix the limits between C. T. and *Vascular Tissue* (q. v.). Some kinds of plants, however, are entirely composed of C. T. (see next article); all consist of it in the earliest stages of their growth; none are at any time destitute of it. Fluids are transmitted from cell to cell, through the mass of C. T., passing through the walls of the cells where there are no openings that can be detected by the microscope. The soft and succulent parts of plants, which it is the care of the gardener to cherish and increase, consist chiefly of cellular tissue.

CELLULA'RÉS, in Botany, a designation applied to those plants which consist entirely of *Cellular Tissue* (q. v.), without proper vessels of any kind. C., thus defined, are a sub-class of acotyledonous plants, containing the orders of *Lichens*, *Fungi*, and *Algæ*. In the system of De Candolle, however, the name C. was given to the second grand division of plants, the first being called *Vasculares*, and the distinction between them being the presence or absence of vessels, the C. including all acotyledonous or cryptogamous plants. But ferns and mosses are not destitute of vessels; so that this system is not strictly accurate with regard to them: whilst, as all vessels are now known to be formed by the elongation and union of cells, the distinction between vascular and cellular tissue is not generally regarded as affording a good basis for primary divisions in the classification of plants.

CELLULO'SE is the term applied to the carbohydrate, $C_{12}H_{10}O_{10}$, which forms the mass of the cell-membranes of all plants. It is one of a class of compounds intimately connected in their chemical constitution, but presenting remarkable physical differences. Without entering into chemical details, we may mention the

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following points of difference between it and the chemically allied substances—sugar, dextrine, and starch. Sugar and dextrine are soluble in cold water, and occur in the cell sap in solution; starch is insoluble in cold water, but softens into a mucilage in boiling water, and is found in granules in the cell-contents; while C. is insoluble in cold or boiling water, and as far as is at present known, is very slightly soluble in the strong mineral acids, its only perfect solvent being a solution of oxide of copper in ammonia.

The occurence of C. in an organism was formerly regarded as a certain proof that the latter belonged to the vegetable kingdom. It has, however, been shown to be a constituent of the lower animals.

Although C. forms a large proportion of the food of herbivorous animals, it is supposed to pass through the intestinal canal unchanged, and not to contribute directly to nutrition.

CELSUS, an Epicurean philosopher, but tinged with Platonism, lived in the 2d c. after Christ, and wrote, after 150 A.D., under the title "Logos Alethes" (the True Word), the first considerable polemic against Christianity. The book itself has perished; but considerable fragments have been preserved as quotations given by Origen in his answer, "Contra Celsum," in eight books. In the fragments—which are very interesting, as shewing the views of a heathen philosopher in regard to Christianity—C., with wit and acuteness, but without depth or earnestness of thought, prefers against the new religion charges of unphilosophicalness and blind credulity; and especially endeavors to convict Christians of self-contradiction in their spiritual doctrine contrasted with their anthropomorphic representations of Deity; in their religious arrogance contrasted with their confession of sinfulness; and in their views of the necessity of redemption. He also reproaches Christians with their party divisions and ever-varying opinion. With regard to his own positive doctrine, he speaks of evil as necessary and eternal, as an essential property of the material world (*hyle*); sin as something that can never be entirely removed, and least of all, through a vicarious sacrifice. He charges Christians with having wilfully altered their sacred writings.

CELSUS, Aulus Cornelius, a Latin physician and writer, who flourished probably in the reign of Augustus. He was called the Roman Hippocrates, because he generally followed the great "Father of Medicine," and introduced the Hippocratic system among the Romans. C. wrote not only on medicine, but also on rhetoric, history, philosophy, the art of war, and agriculture. His style is succinct and clear, but full of Græcisms. The only great work of his which survives, is the "De Medicinâ," which is divided into eight books. The portions relating to surgery are exceedingly interesting and valuable, because C. has there given an account of the opinions and observations of the Alexandrian school of medicine. The first edition of the "De Medicinâ" appeared at Florence in 1478. C.'s works have been translated into several modern languages. A translation into English was made by Dr Grieve, London, 1756. Among the best editions are those of Krause (Leip. 1766), Dr Milligan's 2d edition (Edin. 1831), and one at Cologne, 1885.

CELT (Lat. *celtis*, a chisel), the name by which certain weapons or implements of the early inhabitants of Western Europe are known among archæologists. Celts are either of *stone* or of *bronze*.

Stone celts vary in length from about 1 inch to 22 inches; but the most common size is from 6 to 8 inches in length, and from 2 to 3½ inches in breadth. They are made of almost every kind of stone, and shew considerable diversity of shape, almost all, however, having more or less resemblance to the muscle-shell. The ruder celts are generally of slate, shale, schist, or grit; the finer, of flint, porphyry, greenstone, syenite, or agate. Many of the finer celts are beautifully shaped and highly polished. A remarkable example of this class, the property of Sir Coutts Lindsay, found near St Andrews, in Scotland, is described by Sir David Brewster in the "Philosophical Journal" for 1823. Recently, a class of celts found in the later geological strata have excited much interest as well among archæologists as among geologists. They are obviously of the same type with the more common celts, but of ruder construction, as if fashioned by a more barbarous people. The stone C. was fastened into a handle of horn, bone, or wood,. A C. of serpentine, with a handle of deer-horn, was found in one of the Swiss lakes in July

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1859. A stone C. with a wooden handle, was found in the county of Tyrone, in Ireland.

Bronze celts vary in length from about 1 inch to 8 or 10 inches, the most common length being about 6 inches. They are sometimes ornamented with rudely incised lines or circles, and have occasionally been found wrapped up in linen, or enclosed in bronze cases or sheaths. They shew much greater diversity of shape than the stone celt. As many as four classes have been distinguished by archæologists—*1st*, The simple wedge-shaped C., most nearly resembling the common form of the stone C. *2d*, the wedge-shaped C., with sides more or less overlapping, and a stop ridge or elevation between the blade and the part which received the handle. *3d*, The wedge-shaped C., with sides greatly overlapping, with or without the stop-ridge, but with a loop or ear upon, and parallel to, its lower surface. *4th*, The socketed C., or the C. with a hollow to receive the handle, and generally with a loop or ear upon its lower surface.

Both stone and bronze celts were probably used for several purposes, serving for chisels, adzes, and axes, as well as for weapons of war, like the stone hatchets of the South Sea Islanders and other savage or barbarous tribes. Examples of stone and bronze celts of all classes (together with the moulds in which bronze celts were cast) may be seen in the British Museum at London, in the National Museum of the Antiquaries of Scotland at Edinburgh, and in the Museum of the Royal Irish Academy at Dublin. This last collection has more than 500 examples of stone celts, about one-half of which were found in deepening the bed of the Shannon or its tributaries, between the years 1843 and 1848. A bushel of bronze celts has more than once been discovered at one spot.

CELTIBE'RI, a powerful people of ancient Spain, supposed to have sprung from a blending of the Iberians or Spanish aborigines with Celtic invaders from Gaul. The C. inhabited a large inland district of the Peninsula, corresponding to the south-west half of Aragon, nearly the whole of Cuença and Soria, and a great part of Burgos, but the name Celtiberia had often a wider signification, including the country as far south as the sources of the Guadalquivir. The C. were divided into four tribes, and were unquestionably one of the bravest and noblest peoples in the Peninsula. Their cavalry and infantry were equally excellent. For many years, they withstood the efforts of the Romans to subdue them, and it was not till after the campaigns of Sertorius that they began to adopt the Roman language, dress, and manners.

CELTIC NATIONS, one of the groups of the great Aryan (q. v.) family.

Languages.—In addition to the English, and retreating before it, there are at present four languages spoken in the British Isles—the Irish, the Highland Scotch (or Gaelic), the Manx, in the Isle of Man—all three nearly related to one another, and constituting the northern (Erse Gadhelic) branch of the Celtic languages; whilst the fourth language, the Welsh, constitutes, together with the Cornish of Cornwall (extinct since 1778) and the Bas Breton of Brittany, the southern (Britain, Cymric, Cambric) branch. The remains of the language of the Gauls or Celts, the ancient inhabitants of France, closely resemble the British and Gadhelic idioms; hence the name Celtic languages has been applied to the whole of them. The Celtic idioms belong to the Indo-German (Aryan) family, as their numerals shew Compare

Old Irish.	Old Welsh.	Sanscrit.
1. óin	un	êka
2. dá	dou	dvâu
3. trí	tri	trayas
4. cethir (c=k)	pedwar	chatvâras
5. cóic	pimp	panchan
6. se	chwech	shash
7. secht(n)	seith	saptan
8. oct(n)	wyth	ashtan
9. noi(n)	nau	navan
10. deich	dec	daçan
20. fichet	ugeint	vinçati
100. cét	cant	çata

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The Gaulish was nearer to the Cymric branch, its numerals 4 and 5 having been *petor, pempe*. There are a few Gaulish inscriptions which shew a declension with full inflections; in old Irish five cases still exist, but the terminations are very much mutilated; in Welsh they have disappeared. Thus, the Gaulish name *Segomaros* is declined: gen. *-ri*, dat. *-ru*, acc. *-ron:* the old Irish, *fer*, a man, has the gen. *fir*, dat. *fiur*, acc. *fer*, voc. *fir;* whilst the corresponding Welsh *gwr* is inflexible. Hence it follows that the pseudo-simplicity of the Welsh is the result of grammatical decay, common in all Aryan languages, and does not at all warrant Latham's theory, that the Celts branched off from the primitive Indo-German nation before the development of case inflections.

History.—Of the separation of the Celts from the other Aryans or Indo-Germans and their early migrations to Western Europe, no record has come down, the stories about Milesian colonies in Ireland, and migrations from Troy into Wales, being simply monkish fictions. At the dawn of history, we find the *Gauls* (Galli, Celtæ, *Galatai*) occupying France (Gallia), which was divided into *Aquitania*, between the Pyrenees and Garonne: *Gallia Celtica* Proper, between Garonne and Seine; and *Belgica*, from the Seine to the Rhine. The land about the *Rhone* being more early conquered by the Romans than the rest, was set apart by them under the name of *Gallia Narbonensis*, or *Gallia Lugdunensis* (from the towns Narbo and Lugdunum, Narbonne and Lyon). The whole of the four were called *Gaul beyond the Alps* (Gallia Transalpina). A great many tribes of Gauls had settled in Lombardy, where they founded *Mediolanum* (Milan), and which therefore took the name *Gallia Cisalpina* (Gaul this side the Alps). Other Gauls had penetrated into Spain, where they became mixed with the native Iberians, and thus gave rise to the *Celtiberians* about the river Iberus (Ebro). Numerous hosts migrated across the Rhine, occupied Southern Germany and Bohemia, and, following the course of the Danube, some invaded Thrace and Greece (278 B.C.); but being repelled, the main body of them settled in Asia Minor, in the province called after them *Galatia*. The Romans found the Gauls at first very formidable enemies; Rome itself was burned by them (389 B.C.), but gradually the Romans conquered first Gallia Cisalpina (222), then Gallia Narbonensis (112), and lastly, Cæsar subjected all France (52 B.C.), after which the Gauls soon became Romanised. The Gauls of Asia Minor, for a long time the terror of all the neighborhood, were defeated by the Romans (187), and their land finally made a province of the empire (25 B.C.) —The *Britons* (*Britanni*; Welsh, *Brython*) were little known before Cæsar's two unsuccessful expeditions into Britannia; the country was conquered by the Roman general Agricola, (78—84 A.D.), who secured the new province against the inroads of the Caledonians of Scotland by a fortification across the Scotch Lowlands, between the Forth and the Clyde, afterwards removed by the Emperor Hadrian further southward, to between Solway Firth and the mouth of the Tyne. The Britons were so much influenced by Roman civilisation—they were also early converted to Christianity—that the heathen Angles and Saxons, who conquered them in the 5th and 6th centuries, called them *Welsh;* a name which, with the other Teutons, applies to all nations speaking languages of Latin descent. A few of the Britons maintained their independence in Cornwall, Cumberland, and in the mountains of *Wales*. On the last, the name Welsh was ultimately fixed by the English; they themselves, however, called their nation *Cymro*, pl. *Cymry* (a compound of *cyn*, with, in common, and *bro*, land—having a common country, countrymen, in contradistinction to the foreign invader), a name which has nothing to do with Cimbri and Cimmerii. The Welsh remained independent under different petty princes till 1283, when Edward I. conquered them. A part of the Britons went over in the 4th c. to France, where they took possession of *Brittany*, which maintained a doubtful independence under dukes of its own until about 1500.—Whether the *Caledonians*, the oldest inhabitants of Scotland, were Celts of the Cymric or Erse branch, is unknown. After the 3d c., their name disappears, and we hear, instead, of the Scoti and Picti. As to the latter, the same doubt prevails; but the *Scoti* were emigrants from Ireland, both *Scotus* and *Gadhelus* being common national names of the old Irish. From *Gadhel*, the modern *Gael*, *Gaelic* is derived, which has nothing to do with the name of the Galli.—*Ireland* (*Hibernia*, whence the modern *Eirinn* is derived) enters into the light of history with its conversion to Christianity by St Patrick (460). The four centuries following on this event are the brightest period in its history. Ireland was then the seat of piety and learning, and sent forth numerous missionaries, by

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whom many monasteries, centres of civilisation, were founded—as *Iona*, in Scotland, by Columba (563); *St Gall*, by Gallus (615); *Würzburg*, by Kilian (687). In the 7th c., we find Irish bishops at Ratisbon; and *Virgilius* (Fearga:). (died 784), Bishop of Salzburg, played no small part in the ecclesiastical history of Germany. But Ireland remained politically divided among many princes, and so became an easy prey of those "black heathens" the Scandinavians, whose invasions began 795, and who founded Norse kingdoms at Dublin, Waterford, Limerick, &c. In the fierce battles between the two nations, the prosperity of Ireland rapidly declined, and the English conquest (1171) only completed the ruin.—The Isle of *Man*, inhabited by a branch of the Irish, after having been subject to Welsh, Scotch, Norse princes in turn, acknowledged England's sovereignty in 1344.

Religion and Mythology.—A few notices in the classics and the Latin inscriptions of Gaul are our rather meagre sources of information on the Celtic paganism. As the three chief gods, or three of the chief gods, Lucan mentions *Teutates*, *Hesus*, and *Taranis*, all of them worshipped with human sacrifices. *Taranis* reappears as *Jupiter Taranuonus* on an inscription; and from this identification with Jupiter, as well as from the fact that in Welsh *taran* means thunder, we may infer that he was the god of the thunderstorm. Other gods frequently occurring on inscriptions are *Apollo Grannus*, *Apollo Belanus*, *Mars Camulus*, *Minerva Belisama*, &c., all of them, however, empty names to us. A remarkable feature in Gaulish religion was the worship of certain *Mother Goddesses* (called on the inscriptions Junones, Matronæ, Deæ Matres, Campestres, Nymphæ). They are frequently connected with special localities, as in the inscriptions dedicated to Matronis Lanehiabus, M. Hamavehis, M. Rumanehabus, and on the one in Gaulish: *Matreba Namaucicabo*, "to the Mothers of Nimes." To this class apparently belongs the *Dea Nehalennia*, once represented on a relief with a basket of fruit, and a dog for companion. Mela, the geographer, speaks of an island in the Atlantic, near Gaul, where there was an oracle superintended by nine maidens, who could cause storms, take the form of any animal, could cure what otherwise was incurable, and predicted the future. These goddesses, at once motherly and maidenly, residing in field and wood (campestres, nymphæ), givers of plenty and prophets of the future, are the heathen prototypes of the *fées* (fairies, as distinguished from "elfs") of the middle ages. The "little folk" were known to the Gauls under the name of *Dusii*. They believed in the existence of individual tutelary genii, as a stone of Lausanne shews, being erected by three Gauls *Sulfis* suis (hence our sylph?). The belief in the transmigration of souls was common amongst the Gauls, or at least their priests the *Druids*, so called from their performing sacred rites in oak-woods (Welsh, *derw*, an oak; *derwydd*, a Druid). These Druids were also the depositaries of knowledge and tradition, and constituted, in Gaul at least, a powerful hierarchy, with a supreme pontiff. Druids are found both in Ireland and in Wales, and the fées abound in Welsh tradition; but it is very doubtful whether the superhuman beings appearing in the Welsh poems of the 12th and 13th centuries—such as "Hu Gadarn," the reputed founder of Bardic institutions (see beneath)—are genuine relics of the British religion. The belief in transmigration lasted very long, as the medieval Welsh tale of "Taliesin" speaks distinctly of Taliesin's successive existences. Though not properly mythological, we may mention here the romantic stories of the Britons about King *Arthur* and his knights. He is first mentioned by Nennius in the 9th c.; but his fable was further developed in the next centuries both in Wales and Brittany, then embodied in Geoffrey of Monmouth's "Historia Britonum," which served as the groundwork of the French "Roman de Brut" of Wace. Through these works, and partly, also, through the direct influence of the oral traditions of Brittany, it passed into French literature, and thence spread over all Europe.

Literature.—The Gauls learned writing from the Greeks; later, they employed the Roman alphabet, as do the Welsh and Irish, the now used Irish character being nothing but the common Anglo-Saxon form of the Latin alphabet. Besides, however, the Irish claim an old character of their own, the Ogham, in which the letters are represented by a number of vertical strokes put in a right angle to a horizontal line, or else by horizontal strokes to a vertical line. Some of the Ogham inscriptions are said to be older than Christianity. Even more doubtful is the antiquity of a Welsh so-called Bardic alphabet, in which there seem to be no inscriptions extant

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and which is, at anyrate, an alteration of the Roman character. A feature common to all Celts in existence of a kind of literary order, the *Bards* (q. v.), poets and guardians of tradition—in Gaul, nearly related to or part of the priesthood; in Wales and Ireland, in immediate connection with the kings.—A *Gaulish* literature there certainly was, as Cæsar informs us that, in the schools of the Druids, the young men used to learn by heart a great number of verses on theological and historical subjects. But these poems were never written down. It is highly probable that rhyme, first used by St Ambrosius (397) in his hymns, is of Gaulish origin, this being the common form even of the oldest Irish and Welsh poems.—The *Irish* literature began with the conversion, but our existing manuscripts are not older than the 9th or 8th century. Interlinear versions of biblical and other theological, or of grammatica, writings are about the oldest manuscripts, many of which, in consequence of the missionary zeal of the nation, are to be found at St Gall, Milan, and other continental places. Then there are ecclesiastical *hymns*, one of the oldest ascribed to Patrick. A renowned author of poems, in the 10th century, was Eochad O'Flin. Secular poetry of ancient times there has come down to us none, but we have testimonies as old as the 12th c., of the existence of such, ascribed to a general way to the old pagan hero, Oisin, son of MacCumhal. The existing specimens, mostly warlike—except some dialogues between Oisin and St Patrick—are recent. Those Gaels that went over to Scotland, took, of course, similar traditions with them. With a partial knowledge of these, Macpherson composed (1765) the work which he declared (rather loosely) to be an English translation of the songs of the old Scotch poet Ossian, son of Fingal (the true Oisin was an Irishman). The would-be Gaelic original of Macpherson's work, edited in 1807, is either a compilation or a retranslation. Of Irish prose, the annals are the most important part: first, those of Tighernach (1088), then the "Annales Inisfallenses, A. Ultonienses;" lastly, the "Annals of the Four Masters," being a compilation made (1634) from older sources chiefly by four Franciscans, beginning with 242 after the Deluge, and ending with 1616 A.D.—The oldest remains of *Welsh* literature are the songs, so far as they are genuine, of the bards of the 6th c.—"Liwarch Hen, Aneurin, Taliesin"—having chiefly the life and deeds of contemporary princes for their subject, but few in number. In the 10th c., we have the collection of laws by Howel Dda. The historians Gildas and Nennius, of the 9th c., wrote in Latin.

The great age of *Welsh* literature is the 12th and succeeding centuries, when the energies of the nation were roused in the struggle with England. In this contest the bards played a conspicuous part as agitators. After a long interval we hear again of a great bard, Meylyr (1100); many follow, amongst whom Kynddelw (1900) deserves special mention, both as a poet (we have 49 pieces of his) and a patriot. Welsh poetry consists in—1. Political lyrics, war songs, songs in praise of chieftains, elegies on the same. 2. Religious hymns. 3. Pseudonymous poems ascribed to Merddin (Merlin), the mythical enchanter, and Taliesin, the old bard, having generally the form of propheseies on the struggle between the Saxons and Welsh, and the ultimate triumph of the latter. Thus in the *Avalcavau* (or Apple trees) attributes to Merlin, the Welsh nation is enigmatically represented under the image of "seven score and seven sweet apple trees," whose fruits, princes (viz., the English) wish in vain to despoil. 4. The Triads, short memorial (?) verses in which *three* remarkable events, subjects, or persons are respectively mentioned (hence the name), embracing history, theology, jurisprudence. 5. Dialogues of dramatic character. There were—apparently now lost—also miracle plays actually represented.

The only remarkable remnant of *Cornish literature* comes under this head, being three ecclesiastical plays of the 14th c.—the "Creation," the "Passion," and the "Resurrection."—In Welsh prose, we have first the chronicles. Geoffrey's chronicle, though Latin, is thoroughly national: then there is that of Caradoc, who begins where Geoffrey leaves off; and the "Liber Landavensis," a history of the bishops of Llandaff down to 1132. Further, we have the "Mabinogion" (Children's Tales), romantic stories. The most interesting of these refer to Arthur and his champions; the lady of the fountain, Peredur, Geraint (now revived by Tennyson), Arthur's boar-hunt. Amongst the non-Arthurian tales, special mention is deserved by the "Mabinogi of Taliesin," interspersed with verses, relating the adventures, transformations into animal shape, and transmigrations of that bard. There

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are besides some scientific writings, a treatise on medicine, another on geometry, and one on Welsh prosody by Edeyrn (1260). This last, a grammatical essay in and on a vernacular tongue, is paralleled in the middle ages only by Icelandic literature, to which, upon the whole, the Welsh, although not quite so high, bears a marked resemblance.

Concluding Remarks.—Altogether, the Celts are a very important branch of our Indo-German family. The incessant warfares of the Gauls bespeak at least activity of mind and body; the Irish missions have done a great deal for European civilization; whilst the traditions of the Britons have deeply influenced medieval literature. The one great defect of the Celts is incapacity for political organisation. Their very enthusiasm, lively feeling, and vivid imagination, have ever prevented them from taking coolly and deliberately those measures which lead to national unity; hence it is that they gave way before the more practical Roman and Teuton. But while they lost their independence, and oftentimes their very language in the contest with the foreigner, whose strong hand moulded them into national unity, yet they reacted on him in their turn. They are fast disappearing by merging into the English; but if the quiet resolution, the sturdy common sense, the talent for public life, state organization, and political dominion, that characterise the modern British nation, are altogether Teutonic—on the other hand, their genuine refinement of manner and feeling, and their high poetical susceptibilities, are to no small extent due to the admixture of Celtic blood.

CELTIS. See NETTLE-TREE.

CE'MBRA NUT and Cembra Pine. See PINE.

CEMENTA'TION OF STEEL is the process followed in the production of *Blistered Steel* (q. v.), or *steel of cementation*.

CEME'NTS. A cement is a substance used to make the surfaces of solid bodies adhere to one another; it is applied in a liquid or viscous state, and hardens after the surfaces are brought together. When fused metals or alloys are used in this manner, they are called solders. There is a great variety of C. derived from animal, vegetable, and mineral substances. The animal C. are chiefly composed of gelatine and albumen as their bases. Joiners' glue is an example. See GLUE. The binding materials of vegetable C. are gums, resins, and wax. The mineral C. are chiefly of lime and its compounds. In many C., animal, vegetable, and mineral substances are combined. The simplest of the mineral C. is plaster of Paris, which is used for uniting slabs of marble, alabaster, and many similar purposes. It is mixed with water to the consistence of thick cream, and then applied. This hardens rapidly, but is not very strong. Its hardening depends upon the true chemical combination of the water with anhydrous sulphate of lime, of which plaster of Paris is composed, and the formation thereby of a solid hydrate. The plaster of Paris may be mixed with thin glue, with diluted white of egg, or a solution of size or gum, instead of water, and is strengthened thereby.

Keene's marble-cement is prepared by steeping plaster of Paris in a concentrated solution of alum, then recalcining and powdering. This powder is mixed with water in the same manner as plaster of Paris. It is used as a stucco for internal decorations, takes a high polish, and when colored, forms beautiful imitations of mosaic, marbles, scagliola, &c.

A mixture of paper-pulp, size, and plaster of Paris in equal proportions, forms a useful cement, and is also used as a sort of papier-mâché for casting into architectural ornaments, &c.

Common mortar is one of the most important of the lime cements. It is composed of slacked lime, or a mixture of this with sand; its hardening depends upon the slow formation of carbonate of lime by the absorption of carbonic acid from the atmosphere, and a partial combination with the silica of the sand. Cow-hair is sometimes mixed with it, to bind it when laid in masses. In order to obtain a fine smooth paste, which is required for good mortar, the lime should be slacked rapidly by adding about three parts of water to one of lime; if the quantity of water is too small, a coarser or semi-crystalline hydrate of lime is produced by the slaking. For the mode of applying mortar, see BRICKWORK.

Ordinary mortar, when exposed to the continuous action of water, softens and

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disintegrates, and some of the lime dissolves away. Lime which contains 20 or 30 per cent. of clay, or finely divided silica, produces a mortar which is not liable to this softening, but possesses the property of hardening under water; such lime is called *hydraulic*, and the mortar made from it, hydraulic cement or mortar.

Puzzolana, a porous lava found at Puzzuoli, near Naples, has been long celebrated for its property of forming a hydraulic cement, when mixed with ordinary lime. It is mainly composed of silicates of alumina, lime and soda. Portland cement, so named from its resemblance to Portland stone when dry, is made from clay found in the valley of the Medway, which is intimately mixed with the neighboring chalk, and then burned. Roman cement is similar to the Portland, but of a darker color; it contains a larger proportion of clay, and solidifies more rapidly. These C. should be mixed with a sufficient quantity of water, to form a moderately thick paste; the surfaces to which they are applied should be well wetted, and the cement kept slightly moist until it hardens. The solidification of hydraulic cements depends upon the combination of the lime with the silica and alumina forming, first a hydrated compound, and finally a true silicate. They expand slightly in solidifying.

The following receipts include some of the most useful and reliable C. applicable to the purposes specified: For water-tight joints, such as slate cisterns, aquaria, &c., and for uniting broken pieces of stone, and filling up metallic joints—take equal parts of red and white lead, and work them into a stiff paste with boiled linseed oil. When used for metal joints, it should be made rather thin, and both pieces of metal, as well as the washer, well smeared with it. This cement hardens slowly, but becomes ultimately of almost flinty hardness. We have before us an aquarium, holding fifteen gallons of water, made of plate-grass, cemented at the angles to mahogany columns with this composition. It has stood without leaking for above three years, in spite of much rough handling and moving about; and the cement is now so hard, that it is difficult to scratch it with a knife.

Cement composed of ox-blood thickened with finely powdered quicklime, is used by coppersmiths for securing the edges of rivets of copper boilers, and for steam-joints. Another cement for steam-joints is made with borings or turnings of cast-iron, mixed with a little sal ammoniac and flower of sulphur. It should be stirred up with a small quantity of water, just sufficient to moisten it, then rammed into the joint, which should be bolted up as tightly as possible: 5 lbs. of iron borings to 2 oz. of sal ammoniac, and 1 oz. of sulphur, are the proportions recommended. A cement of this kind may be made of 4 lbs. iron borings, 2 lbs. pipe-clay, and 1 lb. of powdered earthenware fragments made into a paste with salt and water; or 2 parts litharge in fine powder, 1 part very fine sand, and 1 of quicklime that has slaked spontaneously in a damp place. These should be mixed, and kept from the air, and made into a paste with boiled linseed oil when about to be used. This is a valuable cement for steam-joints, for mending cracks in boilers, ovens, &c. Beale's Patent Fireproof Cement, for similar purposes, is composed of chalk, 12 parts; lime and salt, each 4 parts; Barnsey sand, 2 parts; iron filings or dust, 1 part; and blue or red clay, 1 part. These are ground and calcined together.

Electrical Cement—so called from its use in uniting the cylinders of electrical machines to their axes, and for a variety of similar purposes—is composed of 5 lbs. rosin, 1 lb. each of bees'-wax and red ochre, and 4 oz. of plaster of Paris. This is Singer's formula. A cheaper cement of this kind may be made from 14 parts of rosin, 2 red ochre, and 1 plaster of Paris. These should be melted together till the frothing ceases and the composition runs smoothly. This is applicable to a variety of purposes, where a cheap and tolerably adhesive cement is required. It will serve as bottle-wax for sealing the tops of corks; but this is usually prepared from 4 parts rosin with one of tallow or suet, and red ochre or other coloring matter added.

For mending earthenware and china, &c., a variety of C. are recommended. For ornamental glass or china, which is not subjected to heat or rough usage, Canada balsam that has evaporated until rather hard, is a very useful cement; from its transparency, in makes an almost invisible joint. The surfaces should be slightly warmed, and the balsam brushed over them, after which they should be kept pressed together for a short time. Thick copal or mastic varnish may be used in the same manner. Gum shell-lac, dissolved in spirits of wine in sufficient quantity to form a treacly liquid, forms a stronger cement than the above, but its color is objectionable

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for some purposes. The shell-lac may be dissolved in naphtha, but is not equal to that in spirits of wine. The *liquid glue* sold in the shops is usually prepared in this manner; another kind is made of a mixture of the solutions of shell-lac and India rubber. The cement sold in sticks at fairs and in the streets of London by loquacious itinerants, is shell-lac or gum mastic fused and moulded into a convenient form, and is one of the most useful C. when properly applied, by heating the surfaces to be joined just sufficiently to fuse the shell-lac, and then smearing them thinly with it, and pressing them together. If shell-lac is heated much above its fusing-point, it becomes carbonised and rotten, and therefore great care must be used in fusing any composition of which it is an ingredient. The *marine glue*, a mixture of shell-lac and India rubber, is a remarkable cement, and when applied, as the last, with the precautions just alluded to, is so strong, that glass or china cemented with it, and then dashed on the ground, or otherwise broken again, will give way in any part rather than that cemented. This cement may be purchased ready made. For the mode of preparing it see GLUE.

Universal Cement, used for the above and many other purposes, is prepared as follows: Curdle skim-milk with rennet or vinegar, press out the whey, and dry the curd at a very gentle heat, but as quickly as possible. When it has become quite dry, grind it in a coffee or pepper mill, and next triturate it in a mortar until reduced to a very fine powder. Mix this powder with $\frac{1}{10}$th of its weight of new dry quicklime, also in very fine powder, and to every ounce of the mixture add 5 or 6 grains of powdered camphor; triturate the whole well together, and keep it in small wide-mouthed phials well corked. When required, make it into a paste with a little water, and apply it immediately.

Cheese Cement is similar in composition and uses. Take two parts of grated cheese and one of quicklime in fine powder; beat these together with white of egg to form a paste, and use immediately.

The following is the reputed formula for preparing the *Armenian or Diamond Cement*, used by the Armenian jewellers for attaching diamonds, &c., without any metallic setting: "Dissolve 5 or 6 bits of gum-mastic, each the size of a large pea, in as much rectified spirit of wine as will suffice to render it liquid; and in another vessel dissolve as much isinglass, previously a little softened in water—though none of the water must be used—in French brandy, or good rum, as will make a 2-ounce phial of very strong glue, adding two very small bits of gum galbanum or ammoniacum, which must be rubbed or ground till they are dissolved. Then mix the whole with a sufficient heat. Keep the glue in a phial closely stopped, and when it is to be used, set the phial in boiling water." This cement has a great reputation, but our experience does not confirm it. We have tried the above, and several other receipts, with very little success. We doubt whether the true method of preparing it is known in this country, and suspect that it still remains one of the oriental trade-secrets. White of egg, thickened with finely powdered quicklime, forms a useful cement, especially if the cemented article is warmed for a short time in a slow oven.

Cutler's Cement, used for fixing knives and forks in handles, is made of equal weights of rosin and brick-dust melted together; or, for a superior quality, 4 parts of rosin, 1 of bees-wax, and 1 of brick-dust.

Mahogany Cement, used for stopping cracks and holes in mahogany, may be prepared by melting 4 parts of bees-wax with 1 of Indian red, and as much yellow ochre as is found requisite to give the color. If shell-lac be substituted for the bees-wax, and less red used, a much harder cement is made.

For *French Cement*, *Rice Glue*, and other light C. for joining paper articles and artificial flowers, see GLUE and PASTE.

CE'METERY, from the Greek, may mean any grave-yard, or other place of deposit for the dead; but it has lately acquired a special meaning, applicable to those extensive ornamental burial-grounds which have recently come into use in this and other European countries, as the practice of burying within and around churches was gradually abandoned (see BURIAL). The fine burial-grounds of the Turks, extending over large tracts, adorned by cedars and other trees, may have suggested the plan to Europeans. It was first exemplified on a great scale in Paris, in which, as the largest walled town in Europe, the disposal of the dead was long a matter of extreme anxiety and difficulty. There

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are few considerable towns in Britain near which there is not at least one C., and the legislation mentioned under the head of BURIAL, has rendered their establishment, to a certain extent, a legal necessity. There was at first a natural feeling of regret at the prospect of deserting places of deposit for the dead so hallowed by ancient use and recent associations as the church and the churchyard. In many instances, however, the places thus professedly hallowed were in reality surrounded by degrading and disgusting circumstances. On the other hand, the new places of interment began to develop humanising and elevating influences, in beautiful trees and flowers, natural scenery, and works of monumental art. The new cemeteries are in many instances cheerful open places of recreation, and in them the place of rest for the dead has rather tended to improve than undermine the health of the living. One of the oldest established and most celebrated of the European cemeteries, is that of Père la Chaise (q. v.), near Paris, the arrangements of which have been generally followed in the cemeteries of London and other English cities; with, however, this distinct difference, that the English cemeteries are divided into two portions—one consecrated for the burials of members of the Established Church, over whose remains the funeral service is read, and one unconsecrated for the burials of dissenters. In the Scottish such distinctions are not required, though the Episcopal Church has some consecrated burying-places. In the United States, as at Philadelphia and New York, there are cemeteries equal in point of arrangement to any in Europe.

CENCI, Beatrice, called "the beautiful parricide," was the daughter of Francesco Cenci, a wealthy Roman nobleman. According to Muratori ("Annales," lib. x.), Francesco was twice married, Beatrice being his daughter by his first wife. After his second marriage, he treated the children of his first wife in a revolting manner, and was even accused of hiring bandits to murder two of his sons on their return from Spain. The beauty of Beatrice inspired him with the horrible and incestuous desire to possess her person; with mingled lust and hate, he persecuted her from day to day, until circumstances enabled him to consummate his brutality. The unfortunate girl besought the help of her relatives, and of Pope Clement VII. (Aldobrandini), but did not receive it; whereupon, in company with her step-mother, and her brother, Giacomo, she planned and executed the murder of her unnatural parent. The crime was discovered, and both she and Giacomo were put to the torture; Giacomo confessed, but Beatrice persisted in the declaration that she was innocent. All, however, were condemned, and put to death, August 1599, in spite of efforts made in their behalf. Such is Muratori's narrative. Others allege that Beatrice was the innocent victim of an infernal plot. The results of Bertolotti's investigations ("Francesco Cenicie la sua Famiglia," 1877,) based on original documents and contemporary notices, go far to deprive the story of the Cenci tragedy of the romantic elements on which Shelley's powerful tragedy mainly turns. Francesco, it would appear, was profligate, but no monster; Beatrice at the time she murdered her father, was not sixteen but twenty-one years of age, was far from beautiful, and probably had already a tarnished moral reputation. And Bertolotti is further convinced that the sweet and mournful countenance which forms one of the treasures of the Barberini Palace in Rome, is not only not the portrait of Beatrice, but was not even painted by Guido, to whom it has long been unhesitatingly attributed.

CENEDA, now officially called Vittorio, a city of Northern Italy, province of Treviso, 36 miles north of Venice. Pop. 10,530. It is an episcopal see, has a very handsome modern cathedral and a fine monolithic fountain. Under the republic of Venice, it was rich, and famed for its manufactures of woollen cloth, silk, and paper. C. is very ancient, dating from the time of the Romans, but now it is a decayed city.

CENIS, Mont, or Monte Cenisio, a mountain pass of the Alps, between Savoy and Piedmont, forming part of the water-shed between the valleys of the Doire and Arc. The culminating point of the pass reaches an elevation of 6775 feet above the sea. Schist, limestone, and gypsum, in alternate beds, compose the strata of the mountain, the vegetation of which is rich in the rarer kinds of Alpine plants. Over the pass a road was constructed (1803—1810) by the Chevalier Fabbroni, under Napoleon's orders, at an expense of £300,000. This is the safest, and most frequented

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road across the Alps. Near the pass, a railway tunnel, 7½ miles long, was begun in 1857, and finished in December 1870.

CE'NOBITES. See MONACHISM.

CENO'MYCE. See REINDEER MOSS.

CE'NOTAPH (Gr. *kenotafion* from *kenos*, empty, and *tafos*, a tomb), a monument which does not contain the remains of the deceased. They were originally erected for those whose bones could not be found, e. g., for those who had perished at sea. Latterly, the name was applied to tombs built by a man during his lifetime, for himself and the members of his family.

CE'NSER (Fr. *encensoir*, from Lat. *incendo*, to burn). a vase or other sacred vessel, used for burning perfumes. See INCENSE. Censers were much used in the Hebrew service of the temple, but their form is not accurately ascertained, and it is probable that they varied in this respect, according to the occasions on which they were used. The C., called also a *thurible* (Lat. *thuribulum*, from *thus*, frankincense), is used in the Roman Catholic Church at mass, vespers, and other offices. It is suspended by chains, which are held in the hand, and is tossed in the air, so as to throw the smoke of the incense in all directions. It varies very much in form, from a simple vase, or chafing-dish, covered by a perforated dome, to an ornamented structure.

CE'NSORS, the name of two Roman officers of state. The office was established by Servius Tullius, the fifth king of Rome. After the expulsion of the kings, it was held by the consuls, special magistrates not being appointed till 443 B.C. It continued to be filled by patricians till 351 B.C., when C. Marcius Rutilus, a plebeian, was elected. Twelve years later, it was enacted that one of the C. (there were always two) must be a plebeian. In 131 B.C., both C. for the first time were plebeians. The C. were elected in the *comitia centuriata*, presided over by a consul. The term of office at first lasted five years, but was shortly afterwards limited to eighteen months. The censorship was regarded as the highest dignity in the state, except the dictatorship. It was a sacred and irresponsible magistracy, whose powers were vast and undefined, and whose decisions were received with solemn reverence. The duties of the C. were threefold. 1. The taking of the census, or register of the citizens and of their property. 2. The *regimen morum* (regulation of morals). 3. The administration of the finances of the state. The taking of the census (Lat. *censeo*, to value, to take an account of) was originally their sole function (hence their name), and was held in the Campus Martius, in a building alled *Villa Publica*. The *regimen morum* was the most dreaded and absolute of their powers. It grew naturally out of the exercise of the previous duty, which compelled them to exclude unworthy persons from the lists of citizens. Gradually, the superintendence of the C. extended from the public to the private life of citizens. They could inflict disgrace (*ignominia*) on any one whose conduct did not square with their notions of rectitude or duty. For instance, if a man neglected the cultivation of his fields, or carried on a disreputable trade, or refused to marry, or treated his family either too kindly or too harshly, or was extravagant, or guilty of bribery, cowardice, &c., he might be degraded, according to h s rank, or otherwise punished. *The administration of the finances of the state* included the regulation of the *tributum*, or property tax; of the *vectigalia*, such as the tithes paid for the public lands, salt-works, mines, customs, &c., which were usually leased out to speculators for five years; the preparation of the state budget, &c.—See Rovers, "De Censorum apud Romanos Auctoritate et Existimatione (Utrecht, 1825).

CE'NSORSHIP OF THE PRESS, the term generally applied to the arrangements for regulating what may be printed, in countries where the press is not free. The simplest form of C. is when a public officer—the censor, or licenser, as he is sometimes called—reads over the MS. to be printed, and after striking out any objectionable passages, certifies that the work may be printed. Thence it is common in old books to see the word *imprimatur*—let it be printed, followed by one or more signatures. Though it has its name from an analogy with the functions of the Roman censor, the C. did not come into operation until the invention of printing. It was common to all European countries, Great Britain included. The C. was established by act of parliament in 1662, 13 Char. II., c. 33: "An act for preventing the

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frequent abuses in printing seditious, treasonable, and unlicensed books and pamphlets, and for regulating of printing and printing-presses." This was a temporary act, renewed from time to time; and its renewal was refused in 1693, owing to a quarrel between the House of Commons and the licenser. Since that time there has been, generally speaking, no restriction in this country on what any man may publish; and he is merely responsible to the law, if in his publication he should commit any public or private wrong. See LIBEL, LAW OF; see also PRESS, FREEDOM OF THE; BOOK-TRADE; and COPYRIGHT.

CE'NSUS means, in this country, the periodical counting of the people. It is a Latin word applied by the Romans to one of the functions of their censors (q. v.). They had to enumerate the people, but only for immediate purposes of taxation, so that no accounts of the results of such enumeration has been preserved. The idea of ascertaining the numbers of the people, and the proportions in which they are divided according to sex, age, profession, rank, and the like, as statistical information, is of late origin. The first C. of Britain was taken in the first year of the present century—1801. From that time it has been taken at each period of ten years. An attempt, but a rather unsuccessful one, was made to take the statistics of Ireland in 1811. Ten years after, the attempt was repeated, but the accuracy of the bare enumeration it furnished was doubtful. That of 1831, which was an improvement, was corrected three years after, in order that it might form the basis of a new system of education. The four subsequent enumerations have been very trustworthy, and have furnished besides valuable statistics regarding the agricultural condition of the country. The system of registration under a registrar-general, established in England in 1836, has given considerable assistance by supplying a staff for carrying out the enumeration, and also by affording the means of checking the C. A similar registration system was extended to Scotland in 1854, of which the C. of 1861 and 1871 have had the advantage. A C. must be taken for the whole empire simultaneously, otherwise it cannot be accurate. The practice is for the enumerating officer in each petty district to leave a schedule at each house, which he receives filled up, aiding, when necessary, in the filling up. The C. of 1851 was taken for the night of the 31st March. This C. supplied important, but not altogether satisfactory information, as to the educational and ecclesiastical condition of the country, elements of which the latter has been left out in 1861 and 1871. The C. of 1861 was taken for the night of Sunday, 7th April; that of 1871 for the night of Sunday, 2d April, a schedule being left in each house on the Saturday, and called for on Monday. The schedule of 1871 contained compartments for "particulars of the name, sex, age, rank, profession or occupation, condition, relation to head of family, and birthplace of every living person" who passed the night of Sunday in the house; whether any was blind, deaf, dumb, imbecile or lunatic; and how many between the ages of 6 and 18 were receiving education. Most civilized nations take a C. at regular intervals—France, every five years, the last in 1872; Belgium, every ten years, the last in 1866, with calculated estimate in 1873; Austria, every ten years, the last in 1869; the United States, the same, the last in 1870; in Germany the last two censuses were taken in 1871 and 1875. The first C. for India was taken between 1867 and 1872.

CENT, and Centi'me (Lat. *centum*, a hundred), names of coins. The Dutch cent is a copper coin = $\frac{1}{100}$th of the guilder, which is equal to 1*s.* 8*d.* sterling. In the United States of America the cent is a copper coin = $\frac{1}{100}$th part of the dollar, or nearly one half-penny English. The Centime is the 100th of the French franc (q. v.), and is of the value of $\frac{1}{10}$ of an English penny.

CENTAU'REA, a genus of plants of the natural order *Compositæ*, sub-order *Cynaraceæ*, containing many species of annual and perennial herbaceous plants, chiefly natives of the temperate and cold regions of the eastern hemisphere. Six or seven species are natives of Britain, some of them common weeds, whilst some species appear among the frequent ornaments of flower-gardens.—The BLUE-BOTTLE, or CORN-BLUE-BOTTLE (*C. Cyanus*), is common in corn-fields in Britain and other parts of Europe, and has now become frequent also in similar situations in America, and indeed over the greater part of the world. It is an annual growing to the height of about two feet, and producing its flowers in July and August. The florets of the disk are small and purple; those of the ray are few, comparatively

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large, and of a bright blue. Its flowers have long been much used in wreaths and garlands. It is common in gardens, with flowers variously modified by cultivation. Water distilled from the flowers of the blue-bottle was at one time in high repute as a remedy for weak eyes. The juice of the florets of the disk, with a little alum, dyes a beautiful and permanent blue.—The large Blue-bottle (*C. montana*), a native of Central Europe, is still more frequently cultivated in flower-gardens. Its flowers are considerably larger, and it is a perennial.—SWEET SULTAN (*C. moschata*), a native of the Levant, with fragrant flowers, is also common in flower-gardens. It is an annual or biennial.—Several species, having the involucre spiny, bear the name of STAR-THISTLE. The common STAR-THISTLE (*C. calcitrapa*) is a native of the southern parts of Britain and of Europe.—The common or Black KNAPWEED, called in Scotland *Horse Knot* (*C. nigra*), is abundant in the meadows and pastures of most parts of Britain, and is a troublesome perennial weed, difficult of extirpation. *C. Jacea*, also called KNAPWEED, more rare in Britain, is very common in some parts of Europe, and its bitter astringent root, and indeed the whole plant, were formerly used in medicine. It affords a beautiful bright yellow dye, almost as good as Saw-wort.—The name C. has its origin in an ancient legend concerning the cure of a centaur by one of the species.

CE'NTAURS ("bull-killers"), a wild race of men who inhabited, in early times, the forests and mountains of Thessaly, and whose chief occupation was bull-hunting. Homer, the first who mentions them, describes them merely as savage, gigantic, and covered with hair. They do not appear as monsters, half-man and half-horse, until the age of Pindar. The C. are celebrated in Greek mythology on account of their war with the *Lapithæ* (q. v.), and their contest with Hercules. The fact lying at the bottom of Pindar's myth may refer to the impression which the old bull hunters of Thessaly, who spent almost their whole life, it is said, on horseback, first made on some of the neighboring tribes—viz., that the man and the horse were one creature, which, at least, we know was the opinion entertained by the Mexicans of the Spanish cavalry. On account of their resemblance to the Satyrs, the C. were at a later period introduced into the artistic representations of the Bacchic worship.

CENTAU'RUS, the *Centaur*, one of the constellations in the southern hemisphere, represented on the celestial globe by a form half-man and half-horse. The stars, in this constellation are, according to Ptolemy's catalogue, 37 in number; according to the Brittannic catalogue, 35. It contains the stars α Centauri and β Centauri, both of the first magnitude.

CE'NTAURY (*Erythræa*), a genus of plants of the natural order *Gentianeæ*, having a funnel-shaped regular 5-partite corolla. The species are pretty little annuals, natives chiefly of the temperate parts of Europe and Asia, with pink or rose colored flowers. They possess the tonic and other medicinal virtues of gentian, and although not frequently administered by physicians, are an important domestic medicine; and the tops are collected when the plant is in flower, by the country people both in England and on the continent of Europe, to be employed in cases of dyspepsia, in intermittent fevers, and as a vermifuge. They contain a substance called *Centaurine*, the hycrochlorate of which is said to be an excellent febrifuge.—The Common C. (*E. Centaurium*) is the species most frequent in Britain; a plant of eight inches to a foot in height, with flowers collected in loose heads, growing in dry pastures. Two or three other species are found on sandy sea-shores. Nearly allied to these is the AMERICAN C. (*Sabbatia angularis*), an annual plant with an erect quadrangular stem, extensively distributed throughout the United States and Canada, and much used in the domestic practice of America, as a prophylactic against autumnal fevers, in strong infusions and large and repeated doses. The name C. owes its origin to the same legend with the name *Centaurea*, although appropriated to plants so different.

CENTE'NES. See TENREC.

CE'NTERING, the framework upon which an arch or vault of stone, brick, or iron is supported during its construction. The simplest form of C. is that used by masons and bricklayers for the arches of common windows, and doors. This is merely a deal-board of the required shape, upon the curved edge of which the bricks

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or stones of the arch are supported until they are keyed in. In building bridges or other structures where arches of great span are to be constructed, the C. is usually made of framed timbers, or timbers and iron combined. The arrangement of the timbers should be such, that the strain upon each shall be mainly a thrust in the direction of its length, for if the strain were transverse, a comparatively slight force would snap it, and if a longitudinal pull, the whole structure would be no stronger than the joints holding the pieces of timber together. In arches of great span, such as that of Waterloo Bridge, London, a longitudinal pulling strain is almost inevitable in some parts, as a beam of great length would bend to some extent under a thrusting strain. In such cases great skill and care are demanded in the designing and construction of the joints. As an arch is built from the piers towards the keystone, the weight upon the haunches during construction tends to push the crown upwards, and therefore the problem of designing a framed C. involves the resistance of this tendency, as well as the supporting of the weight of the materials.

Cast-iron shoes have been successfully used for the tying joints subject to the longitudinal pulling strain. The flexible C., so called from its yielding at the joints, and varying its form with the load put upon it, is now abandoned. It was chiefly used by French engineers. That of Perronet for the bridge of Neuilly is a celebrated example.

Occasionally, when a very great span is required, and the navigation will permit, piers are built, or piles are driven, to support the C., and the design is much simplified thereby.

Cupolas like the Pantheon and St. Peter's at Rome, St. Paul's in London, or the flat domes of the Turkish Mosques, require very effective centerings.

CE'NTIGRADE. See THERMOMETER.

CE'NTIPEDE (*Scolopendra*), a genus of *Myriapoda* (q. v.), having a long slender depressed body, protected by coriaceous plates, 21 pair of legs, distinct eyes, four on each side, and antennæ with seventeen joints. The name is, however, popularly extended to species of nearly allied genera. Centipedes run nimbly, feed on insects, and pursue them into their lurking-places. They have not only a pair of horny jaws, like those of insects, but also another pair of organs closely connected with the mouth, and which are regarded as transformed legs, dilated and united at the base, terminated by a strong hook, and pierced beneath the extremity for the emission of a venomous fluid, which makes their bite quickly fatal to insects, and in the case of the larger species, very painful and even dangerous to the larger animals and to man. The common C. of tropical America (*S. morsitans*) is often nine inches or a foot in length. A species found in the south of Europe (*S. cingulata*) is nearly as large, but its bite does not seem to be equally venomous. It may seem strange that creatures of such aspect as centipedes should ever have been thought of as human food, but Humboldt, in his Personal Narrative, tells us that he has seen Indian children of the tribe of the Chuymas draw large centipedes out of the earth and eat them. The most common British C. is not a true *Scolopendra*, as that genus is now restricted, but is very nearly allied to it. It is known to naturalists as *Lithobius forficatus*. It is plentiful under stones, &c., in summer. Another allied genus *Geophilus*, of more numerous joints and slender form, contains some species which are occasionally phosphorescent, one of which *G. longicornis*, yellow, with a rust-colored head, is very abundant at the roots of turnips, &c. It is supposed, however, to be rather useful than injurious, preying on the destructive larvæ of insects.

CENTLIVRE, Susanna, an English dramatic authoress, was the daughter of a Lincolnshire gentleman, named Freeman, born (most probably) in Ireland, about 1670. Her early history is obscure; but such were her wit and beauty, that on her arrival in London, though a destitute orphan, and only 16 years of age, she won the heart of a nephew of Sir Stephen Fox, who, however, died shortly after their marriage. Her second husband, an officer named Carrol, lost his life in a duel. Left in extreme poverty, his widow endeavored to support herself by writing for the stage, and after producing a tragedy called "The Perjured Husband" (performed first in 1700), made her appearance on the stage. She afterwards married (1706) Joseph Centlivre, principal cook to Queen Anne, with whom she lived happily until the time of her death, December 1, 1723. Her plays—"The Busybody" (of which the leading character, "Marplot," is highly amusing), "A Bold Stroke for a Wife"

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(1717), and "The Wonder" (1714)—though not distinguished by purity of style or truthfulness of portraiture, are lively in their plots, and have kept their place on the stage.

CE'NTO (from Gr. *kentrôn*, patchwork), a name applied to literary trivialities in the form of poems manufactured by putting together distinct verses or passages of one author, or of several authors, so as to make a new meaning. After the decay of genuine poetry among the Greeks, this worthless verse-manufacture came into vogue, as is proved by the *Homero-centones*, a patchwork of lines taken from Homer (edited by Teucher at Leipsic, 1793); but it was much more common among the Romans in the later times of the Empire, when Virgil was frequently abused in this fashion, as in the *C. Nuptialis* of Ausonius (who gives rules for the composition of the C.), and especially in the *C. Virgilianus*, constructed in the 4th c. by Proba Falconia, wife of the Proconsul Adelfius, and giving, in Virgil's misplaced words, an epitome of sacred history! The C. was a favorite recreation in the middle ages. In the 12th c., a monk named Metellus contrived to make a C. of spiritual hymns out of Horace and Virgil.—See "Littérature du Centon," by M. Delepierre (1875).

CENTO, a town of Central Italy, 16 miles northwest of Bologna, is pleasantly situated on a fertile plain near the Reno. It is celebrated as the birthplace of the famous painter Guercino, whose house, adorned with paintings, is still preserved; and in the church of C. are many of his works. Pop. about 5000.

CENTRAL FORCES are those which cause a moving body to tend towards some point or centre, called the centre of force or motion. The doctrine of C. F. has for its starting point the first law of motion—viz., that a body not acted on by any external force will remain at rest, or move uniformly in a straight line. It follows from this law, that if a body in motion either changes its velocity or direction, some external force is acting upon it. The doctrine of C. F. considers the paths which bodies will describe round centres of force, and the varying velocity with which they will pass along in these paths. It investigates the law of the force round which a body describes a known curve, and solves the inverse problem and many others, the general statement of which could convey no clear idea to the unmathematical reader. As gravity is a force which acts on all bodies from the earth's centre, it affords the simplest general illustration of the action of a central force. If a stone be slung from a string, gravity deflects it from the linear path which it would otherwise pursue, and makes it describe a curved line which we know would, in vacuo, be a parabola. Again, the moon is held in her orbit round the earth by the action of gravity, which is constantly preventing her from going off in the line of the tangent to her path at any instant, which she would do, according to the first law of motion, if not deflected therefrom by any external force. To that property of matter by which it maintains its state of rest or motion, unless acted upon by other matter, has been given the name *inertia*.

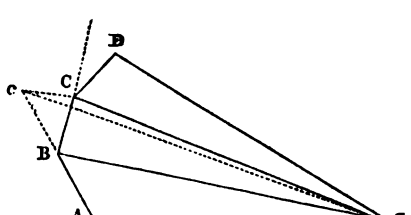

Fig 1.

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We will now explain how, through the action of a central force, a body is made to describe a curved path. Suppose it to have moved for a finite time, and conceive the time divided into very small equal parts; and instead of the central force acting constantly, conceive a series of sudden impulses to be given to the body in the direction of the centre, at the end of each of the equal intervals, and then observe what, on these suppositions, will happen. Let S (see fig 1) be the centre, and let the original motion be from A, on the line AB, which does not pass through S. In the first interval the body will move with a uniform velocity, say from A to B. In the second, if acted on by no force, it would move on in AB produced to *c*, Bc being = AB. But when it arrives at B, it receives the first sudden impulse towards S. By the composition of velocities (q. v.), it will move now with a new but still uniform velocity in BC instead of Bc, BC, being the diagonal of the parallelogram of which the sides represent its impressed and original velocity. Having reached C at the end of the second interval, it receives the second impulse towards S. It will now move in CD instead of in BC produced. If, then, we suppose the periods of time to be indefinitely diminished in length, and increased in number, the broken line ABCD will become ultimately a continuous curve and the series of impulses a continuous force. This completes the explanation.

Going back, however, on our suppositions, we may here establish Newton's leading law of central forces. That the body must always move in the same plane, results from the absence of any force to remove it from the plane in which at any time it may be moving. The triangles ASB and BSC are clearly in the same plane, as the latter is on that in which lie the lines Bc and BS. Also, since the triangles ASB, BSc are equal, being on equal bases, AB, Bc, and triangle BSC = triangle BSc, as they are between the same parallels, cC and BS, it follows (by Euclid I. 37) that ASB = BSC. So BSC = CSD; and so on. In other words, the areas, described in equal times by the line (called the radius vector) joining the centre of force and the body, are equal. As this is true in the limit, we arrive, by the composition of the small equal areas, as the law: That the areas described by the lines drawn from the moving body to the fixed centre of force, are all in one plane, and proportional to the times of describing them. Very few of the laws of C. F. are capable of being proved like the preceding, without drawing largely on Newton's lemmas, with which we shall not suppose the reader to be acquainted.

Centrifugal and Centripetal Force.—We have shewn that a body continually drawn to a centre, if it has an original motion in a line that does not pass through the centre, will describe a curve. At each point in the curve, it tends, through its inertia, to recede from the curve, and proceed in the tangent to it at that point. It always *tends* to move in a straight line in the direction in which it may at any time be moving, and that line, by the definitions of a tangent and of curvature, is the tangent to the curve at the point. At the point A (see fig. 2), it will endeavor to proceed in AD: if nothing hindered it, it would actually proceed in that line, so as, in the time in which it describes the arc of the curve AE, to reach the point D, and thus recede the length DE from the curve; but being continually drawn out of its direction into a curve by a force to a centre, it falls below the point D by the distance DE. The force which draws it through this distance is called the centripetal force, and that which would make it recede in the same time through the distance DE from the curve is called the centrifugal force. It may be remarked that the centrifugal force is not, like the centripetal, an impressed or external force acting on the body. It is simply the assertion of the body's inertia under the circumstances produced by the centripetal force.

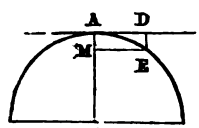

Fig 2.

Many familiar illustrations will occur to the reader of the action of what is called the centrifugal force. A ball fastened to the end of a string, and whirled round, will, if the motion is made sufficiently rapid, at last break the string, and fly off. A glass of water may be whirled so rapidly that, even when the mouth is presented downwards, the water will still be retained in it, by the centrifugal force pressing it up against the bottom of the glass. The centrifugal action will be found to increase with the velocity. In all cases of a body moving in a circle, the force, it can be

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proved, varies as the square of the velocity of the body at the moment, and in the inverse ratio of the radius. As in this case the velocity varies as the radius inversely, it follows that the force is as the inverse cube of the radius. As in the case of circular motion the body always is at the same distance from the centre, it follows that the centrifugal and centripetal forces are equal at all points of a circular orbit. The general law for all orbits is, that the centrifugal force varies as the inverse cube of the distance from the centre. As the attractive force of gravitation varies as the inverse square of the distance, it may hence be shewn that the centrifugal force gives perfect security, notwithstanding the constant attraction of the sun, that the planets, so far as that attraction is concerned, will never fall into the sun.

The doctrine of C. F. owes more to Kepler and Sir Isaac Newton, of whose philosophy it makes a considerable branch, than to all the rest of the philosophers, though almost all the leading mathematicians have contributed to it. The doctrine of centrifugal forces was first mentioned by Huygens, at the end of his "Horologium Oscillatorium," published in 1673; but Newton was the first who fully handled the doctrine, at least so far as regards the conic sections.

CENTRA'LISATION, a term which has lately come into general use for expressing a tendency to administer, by the sovereign or the central government, matters which had been previously under local management. We cannot properly use the term towards an established despotism, for there everything is already directed from the centre. The legitimate application is to a state of change from local to central management—a change in the opposite direction would, on the same principles, be called localisation. Of this latter change, however, it can scarcely be said that we have any recent example, unless it may be found in the systems of self-government lately communicated to some of the British colonies. Ever since the existing European states began to grow out of the chaos of the fall of the Roman empire, there has been a continued progress in centralisation. That empire itself was, however, the greatest instance of C which the world has yet seen. In it the numerous municipalities and other local organisations originally existing in Italy, and communicated to the colonies, were entirely centralised. The empire, such as it had been in the days of Constantine, was the type after which the European monarchs, such of them especially as became more powerful than their neighbors, were ever striving; and a few of them, such as Charlemagne, and, long afterwards, Charles V., seemed to have almost restored it. In this country, we trace C. from the time when there were about a dozen kings in Britain, and perhaps as many in Ireland, till the united kingdom came under the rule of one monarch. A subsidiary C. at the same time made silent progress, absorbing the feudal power of the aristocracy and the municipal privileges of the corporations. In other countries—as, for instance, in France, notwithstanding her desperate struggles for freedom, this process of C. has tended to a pure irresponsible despotism. With so sad a result before their eyes, a distrust of C. has not unnaturally been felt by some inhabitants of Great Britain. But the British constitution possesses a grand remedy, which turns the process to good use instead of mischief. While administrative authority has been centralising in the crown, the controlling power of parliament has been increasing at a more rapid ratio, so that the vesting of a function in the crown or central government, means the putting it under the control of parliament, and especially of the peoples' representatives in the House of Commons. There is nothing done in any of the offices under the government for which a secretary of state, or some other member of the ministry, may not at any time be called to account in parliament. The efficiency of this control was in a manner proved by one or two instances in which offices with central powers were created, without being connected with any of the great state departments. There were, for instance, the English Poor-law Board, and the Board of Health. Both created much discontent and outcry about C., and it was found necessary to transfer their functions to the great government departments, the heads of which are immediately responsible to parliament. It is not the policy of this country in any case to abolish local management, but rather to aid and direct it from the central authority. The constituents of local bodies are often disinclined to watch or control them, and the business falls into the hands of incapable or designing men, or is

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otherwise mismanaged. A very little central help—especially from a quarter where the proceedings of other bodies of the same kind are known—remedies such defects. One of the methods in which the government has of late been in use to exercise its central power, has been by the appointment of inspectors, who make reports which are laid before parliament. This is, in reality, nothing more than a method of concentrating public opinion on the proceedings inspected and reported on, and as such it is very efficacious.

CE'NTRE OF GRA'VITY is that point in a body or system of bodies rigidly connected, upon which the body or system acted upon only by the force of gravity, will balance itself in all positions. Though the action of gravity enters this definition, many of the properties of the point are independent of that force, and might be enunciated and proved without conceiving it to exist. By some, accordingly, the point has been called the *centre of magnitude*, and by others, the *centre of parallel forces*. Such a point exists in every body and system, and only one such point. Everybody may be supposed to be made up of a multitude of minute particles connected by cohesion, and so far as its balance under gravity is concerned, each of these may be supposed to be removed, and its place occupied by a force proportioned to its weight. Instead of the body, on these suppositions, we should then have a system of parallel forces, the lines from the various particles to the earth's centre being regarded as parallel. But a system of parallel forces (see PARALLEL FORCES) has a single resultant acting through a fixed point, whose position is independent of the position in space of the points of application of the component forces, provided their relative positions in the system continue unchanged. This point is the C. of G., and if it be supported, it is clear that the body will balance itself upon it in all positions. The same reasoning obviously applies to any system of bodies rigidly connected. It is usual to demonstrate this and the general rule for finding the C. of G. by proving it first in the case of two heavy particles forming a body or system, and then extending the proof to the case of any number of particles. Let P and Q (see fig. 1) be two heavy particles. Join P and Q, and divide the line PQ in C, so that weight of P : weight of Q :: CQ : CP. Then C will be the C. of G. of P and Q. Draw ACB horizontal, and PM, QN vertical, meeting AB in M and N. Then if P and Q represent the weights of P and Q, we have P : Q :: CQ : CP. But CQ : CP :: CN : CM by similar triangles. Therefore P : Q :: CN : CM, and P.CM = Q.CN. P and Q, therefore, are balanced about C. See BALANCE and LEVER. This is true in all positions of P and Q, for no assumption was made as to their positions. C, therefore, is their centre of gravity. Also, we may conceive P and Q to be removed (see PARALLEL FORCES), and in their stead a particle at C equal to them taken together in weight. If, now, the system contained three, it is clear how we should proceed to find its centre of gravity; having found the C. of G. of two, we should consider the system as formed of two—viz., the equivalent of the first two at their C. of G., and the third. when the case would fall under that already treated; and so on, extending the rule to a system containing any number of particles. Apart from this rule, however, it is possible, in the case of most regular homogeneous bodies, to fix upon their centres of gravity from general considerations. The C. of G. of a straight line, for instance, must clearly be in its middle point. So the C. of G. of a uniform homogeneous cylinder must be in the middle point of its axis. It must be in the axis, for the cylinder clearly is equally balanced about its axis. It must also be somewhere in its middle circular section, for it will balance itself on a knife edge under that section. It must, therefore, be in the point where that section cuts the axis, or in the middle of the axis. The C. of G. of a uniform material plane triangle may be found from similar considerations. The triangle ABC (see fig. 2) may be supposed to be made up of uniform material lines parallel to its base AB; each of these will balance upon its middle point. The whole triangle, therefore, will balance upon the line CD, which bisects

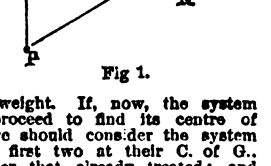

Fig 1.

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the base AB and all lines parallel to it. In the same way, the triangle will balance upon the line AE, bisecting BC. But if a figure balances itself upon a line, its C. of G. must lie in that line. The C. of G. of the triangle is therefore in CD, and also in CB. It must therefore be at g where these lines intersect. g being the only point they have in common. Now, by geometry, we know that g divides CD, so that $Cg = \frac{2}{3}$ CD. Hence the rule for finding the C. of G. of a triangle: Draw a line from the vertex, bisecting the base, and measure off g two-thirds of the line. g is the centre of gravity. By a similar method, the C. of G. of a great number of figures may be determined.

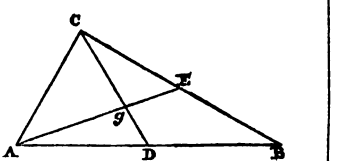

Fig 2.

The above method applies only where the figure of the body is regular, and its mass homogeneous. But many bodies, besides being irregular, are formed by the agglomeration of particles of different specific gravities. Of these, the C. of G. can be found only by experiment, though not always satisfactorily. Let the body be suspended by a string, and allowed to find its position of equilibrium. The equilibrium being due to the tension of the string counter-balancing gravity, it follows that the tension is in the same line with that on which gravity acts on the body. But the tension acts on the line of the string, which therefore passes through the centre of gravity. Mark its direction through the body. Suspending it then by another point, we should ascertain a second line in which lies the centre of gravity. The C. of G., then, must be where these lines intersect.—For the effect on the stability of bodies of the position of the C. of G., see STABILITY.

CE'NTRE OF GYRA'TION is the point at which, if the whole mass of a body rotating round an axis or point of suspension were collected, a given force applied would produce the same angular velocity as it would if applied at the same point to the body itself. The C. of G. bears a strong analogy to the centre of oscillation. The cases differ only in this, that in the latter the operating forces are supposed to act at every point of the moving body, while in the former there is only one force acting upon one point. The C. of G. is found by the following rule: Divide the moment of inertia of the rotating mass by the mass of the body, and extract the square root of the quotient. The result is the distance of the point from the axis of rotation. The moment of inertia, it may be stated, is the sum of the products of the weight of each point of the mass by the square of the perpendicular distance of that point from the axis.

CE'NTRE OF MA'GNITUDE or Fi'gure (see CENTRE OF GRAVITY). C. of M. is the point on which plane figures and curved surfaces would balance themselves, supposing their areas to have weight. Thus, the centre of a circle is its centre of magnitude. Otherwise, C. of M. or F. is a point so situated that all straight lines passing through it, and terminated by the circumference or superficies of the figure or surface are bisected in it.

CE'NTRE OF OSCILLA'TION. Referring to the article PENDULUM, the reader will see that the time of a pendulum's vibration increases with its length, being always proportioned to the square root of its length. This is strictly true only of the simple pendulum, in which the pendulous body is supposed to have no determinate magnitude, and to be connected with the point of suspension by an inflexible wire without weight. If, however, the vibrating body have a determinate magnitude, then the time of vibration will vary, not with the square root of its length, but with the square root of the distance from the axis of suspension of a point in the body called its centre of oscillation.

If each part of the vibrating body were separately connected with the axis of suspension by a fine thread, and entirely disconnected from the rest of the body, it would form an independent simple pendulum, and oscillate as such—the time of each vibration being as the square root of the length of its thread. It follows that those particles of the body which are nearest to the axis of suspension would, as simple pendulums, vibrate more rapidly than those more remote. Being connected, however, as parts of the solid body, they vibrate all in the same time. But this con-

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nection does not affect their *tendencies* to vibrate as simple pendulums, and the motion of the body which they compose is a compromise of these tendencies of its particles. Those nearest the axis are retarded by the more remote, while the more remote are urged on by the nearer. Among these particles there is always one to be found in which the accelerating and retarding effects of the rest are mutually neutralised and which vibrates in the same time as it would if it were unconnected with the other parts of the body, and simply connected by a fine thread to the axis of suspension. The point in the body occupied by this particle is its centre of oscillation. By this C. of O. the calculations respecting the vibration of a solid body are rendered as simple as those of a molecule of inconsiderable magnitude. All the properties which belong to a simple pendulum may be transferred to a vibrating body of any magnitude and figure, by considering it as equivalent to a single particle of matter vibrating at its centre of oscillation.

The determination of the position of the C. of O. of a body usually requires the aid of the calculus. It is always further from the axis of suspension than the centre of gravity is, and always in the line joining the centre of gravity and the point of suspension, when the body is supended from a point. The rule for finding it in such a case is: If S be the point of suspension, and O the C. of O., SO = $\frac{\Sigma (md^2)}{M.Sg}$; or it is the quotient obtained by dividing the moment of inertia of the body by the product of its mass into the distance of its centre of gravity from the point of suspension.

CE'NTRE OF PERCU'SSION. The C. of P. of a body or a system of bodies revolving about a point of axis, is that point in it, which striking an immovable object, the whole mass shall not incline to either side, but rest, as it were, in equilibrio, without acting on the centre or axis of suspension. If the body be moving freely, then the C. of P. is that point in it at which its whole impetus is supposed to be concentrated. In this case, if the body struck with its C. of P. an immovable obstacle, and if it were perfectly rigid and inelastic, it would come to perfect repose; whereas, if it struck the obstacle with any other point, a rotatory motion would be produced in it. When the body is moving freely, and there is no rotatory motion, the C. of P. coincides with the centre of gravity. If the body be moving round a point or axis of suspension, the C. of P. coincides with the centre of oscillation. The more complicated case of a body rotating round an axis within it, would require, for its explanation, analytical formulæ which cannot conveniently be translated into ordinary language. There are many positions which the axis may have in which there will be no C. of P.—i. e., there will be no direction in which an impulse could be applied without producing a shock upon the axis. One case of this sort is that of the axis being a principal axis through the centre of gravity.

CE'NTRE OF PRESSURE. The C. of P. of any surface immersed in a fluid is the point in which the resultant of the pressures of the fluid on the several points meets the surface. When the bottom of a vessel containing fluid, or when a plane immersed in fluid, is horizontal, the pressure on every point of it is the same, being that due to the weight of the column of fluid standing above the bottom or plane. In either case, the pressures at the different points obviously form a system of equal parallel forces, whose centre will be the centre of gravity of the bottom or plane, their resultant passing through this point being the sum of all their forces. But when the plane is inclined at any angle to the surface of the fluid, the pressure is not the same at all points, but is obviously greater at the lower than at the upper points, for the lower have to support taller columns of the fluid. The resultant of these forces, then, will not pass through the centre of gravity of the surface, but through a point below it. This point is the C. of P., and evidently will lie below the centre of gravity for all fluids in which the pressure increases with the depth. If the surface pressed upon form part of the containing vessel, and be supposed movable, it will be kept at rest by a pressure equal to the sum of the fluid pressures applied at the C. of P., and acting in the opposite direction. In the case of a vessel with a parallelogram for one side, the C. of P. is at the distance of one-third of the height from the bottom. In the case of a triangular vessel whose base is at the bottom, it is one-fourth of the height only.

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CENTRI'FUGAL and Centri'petal are terms used in Botany to designate two different kinds of inflorescence, or modes of flowering of plants. When the flower-bud which terminates the floral axis, and is central in the inflorescence, is the first to expand—in which case the others are developed in succession from the centre outwards—the inflorescence is said to be *centrifugal*. When the outermost flowers expand first, the inflorescence is *centripetal*, as is the case in catkins, spikes, and racemes, in which the flowers nearest the base are the first to expand, and those nearest the apex the last. These modes of inflorescence are very characteristic of different plants, of genera, and of orders.

CENTRIFUGAL FORCE. See CENTRAL FORCES.

CENTRIPETAL FORCE. See CENTRAL FORCES.

CEPHAË'LIS. See IPECACUANHA.

CEPHALA'SPIS, a genus of fossil Ganoid fishes, of which six species have been described, two belonging to the upper Silurian, and four to the Devonian measures. The head was protected by a large ganoid plate, sculptured externally with circular radiating markings. Agassiz gave the name C. (buckler-headed) from this extraordinary covering, which has very much the appearance of, and was formerly supposed to be, the cephalic shield of an *Asaphus*. The body was covered with rhomboidal enamelled scales, and furnished with dorsal and pectoral fins; it terminated in a large heterocercal tail. In a graphic description of this fossil in his "Old Red Sandstone," Miller thus sketches the general appearance of the animal: "Has the reader ever seen a saddler's cutting-knife—a tool with a crescent-shaped blade, and the handle fixed transversely in the centre of its concave side? In general outline, the C. resembled this tool; the crescent-shaped blade representing the head, the transverse handle the body." The endo-skeleton was cartilaginous, retaining the notochord through life. The flexible body, assisted by the large tail and the fins, would give the C. the power of moving rapidly through the water. Being a predaceous fish, it must have been a formidable enemy to its associates in the Palæozoic seas, for, besides its power of rapid motion, the sharp margin of its shield probably did the work of a vigorously hurled javelin, as in the sword-fish. This genus was originally named *Asterolepis* (star-scale), from the circular markings on its cephalic shield.

CEPHALO'NIA or Cefalonia, the largest of the seven Ionian Islands (q. v.), is situated at the entrance of the Gulf of Lepanto or Corinth, in lat. 38° 3'—38° 30' n., and long. 20° 21'—20° 49' e. It is irregular in shape. Its greatest length is about 30 miles, and its total area 348 square miles. Its surface is mountainous, the soil, for the most part thin, and water very scarce. The inhabitants, however, are industrious and enterprising, and have planted vineyards wherever the grape will grow, and currants and olive-oil are also produced for export. The climate is warm and agreeable. The population in 1870 amounted to 77,382. The numbers who are brought up to the medical profession are remarkable; it is said that there is hardly a town in the Levant which has not a practitioner from Cephalonia. The inhabitants are also much more disposed to engage in foreign trade than those of Corfu or Zante, and own more vessels. In 1874 the exports amounted to £189,309, and the imports to £240,410. The island is subject to frequent, but slight earthquakes. There was formerly a small English garrison at Cephalonia. Steamers ply between it and Malta, Patras, and Triest. The language spoken is a Greek dialect. The chief towns are Argostoli (q. v.) and Lixuri.

C. is called by Homer Same or Samos, and during the heroic ages was subject to Ulysses, whose residence was in the neighboring isle of Ithaca (q. v.). Later, C. appears under the name of Cephallenia. It successively fell into the hands of the Athenians, Romans, Byzantines, and Venetians, from the last of whom it was several times wrested by the Turks. On the ruin of the Venetian Republic in 1797, it was seized by the French, who were in their turn dislodged by the Russians. In 1809, it came into the possession of England. It was ceded to Greece in 1864.

CEPHALO'PODA (Gr. head-footed), a class of mollusks, the highest in organization of that division of the animal kingdom. To this class belong the Nautili, Spirulæ, Argonauts, Poulpes, Squids or Calamaries, Cuttle-fish, &c., of the present time, and the Ammonites, Belemnites, &c., of former geological periods. The C.

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are all marine, and only a few of them are capable of leaving the water and moving about in search of food on the shore.

The C. receive their name from having organs of prehension and locomotion attached to the head, an arrangement towards which a gradual approach may be traced in the highest gasteropod (q. v.) mollusks. Those organs have been variously designated *arms*, *feet*, and *tentacula*. They "have no true homology" with the limbs of vertebrate animals, but are only analogous to them in respect of the purposes which they serve. The body of the C. is a bag, formed of the *mantle* (see MOLLUSCA), open only at the end to which the head is attached. In some this bag is almost spherical, and locomotion is accomplished only by the appendages of the head; in others the body is elongated and furnished with two fin-like expansions, which are the principal instruments of locomotion. In locomotion by the fins, a cephalopod swims like a fish, with the head first, and often very rapidly; in locomotion by the arms, it drags itself along, laying hold of any object within reach by means of suckers, with which the arms are furnished. Some C. are capable also of moving backwards through the water by alternate contractions and expansions of a muscular web which unites the bases of the arms; some appear to depend for a similar power of swimming backwards upon the forcible ejection of water from the "funnel" below the eyes.

The head of a cephalopod is roundish, generally furnished with two large and prominent eyes, very similar in structure to those of vertebrate animals. There are also ears, but they consist merely of little cavities, one on each side of the brain, in each of which is suspended a membranous sac containing a small stone. The organs of smell are not very certainly known, but it appears that the C. possess this sense, as well as that of taste, of which the character of the tongue is much more indicative than in many vertebrate animals.—The brain forms a ring around the gullet. The whole nervous system is more complex than in the lower mollusks.—The mouth opens in the midst of the circle of arms. It is furnished with a strong horny beak of two mandibles, moving vertically, not unlike the bill of a parrot, but the upper mandible the shorter of the two.—The digestive apparatus is very complicated. The gullet swells out into a crop, and there is a gizzard as muscular as that of a bird. The intestines, after a few convolutions, terminates in the cavity which contains the gills, at the base of the funnel by which the water is ejected after having supplied air for respiration. This cavity is situated within the mantle or bag, and separated from the other viscera by a membranous partition. Into it the water is freely admitted by means of a slit or valvular opening, being drawn in by muscular action, and again expelled with considerable force through the funnel, which opens at the neck, and with its current all secretions, eggs, and excrements are carried forth. There are only two gills in the greater number of existing C., the only exceptions being the two or three known species of *Nautilus*, which have four gills; and two-gilled C.—the order *Dibranchiata*—are in many respects of higher organisation than the four-gilled—the order *Tetrabranchiata*—which, although containing so few recent, contains a vast number of fossil species. Each gill consists of many membranous plates, fixed to two sides of a stalk.—The heart in the *Tetrabranchiata* consists of a single ventricle only; but besides this *systemic* heart, the *Dibranchiata* has two *branchial respiratory* hearts, contractile reservoirs, one for each gill, by which the blood is forced into these organs.

The "arms" or "feet" are very numerous in the *Tetrabranchiata*, not provided with suckers, but hollow, and with long retractile tentacula; in the *Dibranchiata* they are only eight or ten in number, furnished with suckers (*acetabula*); two of them, when they are ten in number, being much longer than the rest, and differing from them in form. The suckers are very admirably constructed—an adhesive disk of muscular membrane, often having a cartilaginous circlet, capable of most exact application to any object, with an aperture in the centre leading into the cavity, the bottom of which can be retracted like a piston so as to form a vacuum, and render the adhesion of the sucker close and firm, whilst on the muscular action being interrupted or reversed, it immediately lets go its hold. The Poulpe has each of its eight flexible arms crowded with 120 pair of such suckers, and as an animal of this kind exists on some tropical shores, with arms about two feet long, it is not wonderful that it is reckoned dangerous. Still more formidable, however, are the Hook-squids of the South Seas, the two long arms of which have suckers furnished in the centre

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with a hook to enter into the flesh of any creature of which they may lay hold, and so more effectually to secure their prey.

The sexes are distinct in all the cephalopoda. The eggs have a horny covering, and after their extrusion from the parent, become agglutinated into masses of various forms. The young, from the first, very much resemble the mature animals except in size.

All the *Dibranchiata* are provided with a peculiar organ of defence, called an "ink-bag," which is wanting in the *Tetrabranchiata*. This ink-bag is filled with a peculiar secretion, capable of being expelled at will to darken the water, and facilitate the escape of the cephalopod.

The Tetrabranchiate C. have a chambered shell. See NAUTILUS. The Dibranchiate C. have no external shell—the shell of the female Argonaut (q. v.) being scarcely an exception—but they have an internal shell (cuttle-fish bone, &c.), sometimes merely rudimentary, included between two folds of the mantle, and apparently intended to give support to the soft body of the animal.

The C. are all very voracious, feeding on fish, mollusk, crustaceans, &c. Even a powerful crab is not safe from the attacks of a Dibranchiate cephalopod little bigger than itself; the arms, so abundantly provided with suckers, seize it, and trammel every movement, whilst the parrot-like beak is strong enough to break the hard shell. Cuttle-fish and squids are often very troublesome to fishermen, following shoals of fish, and devouring great numbers of them after they are entangled in the net.

Fossil C. exist in all the strata which form the earth's crust. The order *Tetrabranchiata* is almost exclusively a fossil order, being represented by not more than four recent species. With the exception of two genera, *Nautilus* and *Aturia*, this order is confined to primary and secondary rocks. The two groups into which it is divided are also characteristic of geological epochs. The *Nautilidæ*, with simple or gently undulating septa, and siphuncle central or in the inner margin, belong, with the exception of the two genera just referred to, to the Palæozoic rocks. Including a small group, which, while it has the siphon on the external margin, has yet simple septa, the *Nautilidæ* are represented by 145 Silurian, 158 Devonian, and 91 Carboniferous species. The *Ammonitidæ* have the siphuncle always on the outer margin of the shell, and the septa with corrugated or lobed margins. This group, with the exception of *Goniatites*, a Palæozoic genus, is peculiar to, and co-extensive with, the secondary strata. Of the 980 species that have been described, more than the half belong to the genus *Ammonites* (q. v.).

The order *Dibranchiata* is found first in the Lias, and extends through the more recent strata, receiving its full development in our present seas. Scarcely 90 fossil species have been described, while more than double that number are known as recent animals. See AMMONITES, ARGONAUT, BELEMNITES, CALAMARY, CERATITES, CUTTLE-FISH, GONIATITES, HOOK-SQUID, NAUTILUS, OCTOPODA, ORTHOCERAS, POULPE, &c.

CEPHALO'PTERA (Gr. head-wing), a genus of cartilaginous fishes of the ray family, the type of a sub-family, *Cephalopteridæ*. The pectoral fins are very much elongated, so as to give great breadth to the fish. The tail is slender and without fin, but armed near its origin with a great spine. The head is terminated in front by a straight line, and on each side of it there projects a membrane (*præcephalic fin*) rolled upon itself, and resembling in shape a pointed horn. The name HORNED RAY has therefore sometimes been given to these creatures, of which only one species, *C. Giorna*, has ever been found on the British coasts. It is not uncommon in the Mediterranean, and there acquires a great size: one is mentioned as having been taken off Messina, which weighed 1250 lbs.—more than half a ton. But this is small in comparison with the size of some of the *Cephalopteridæ* which occur in tropical seas: one taken at Barbodoes required seven yoke of oxen to draw it. They are very dangerous to swimmers and bathers.

CE'PHEUS, a constellation of the northern hemisphere, containing, according to the Britannic catalogue, 35 stars. Its principal star is Alderamin, of the third magnitude.

CEPO'LA. See BANDFISH.

CERA'M, an island in the Moluccas Archipelago, lies n. e. of Amboyna, between

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2° 44′ 30″—8° 30′ 30″ s. lat., and 129° 30′—130° 53′ e. long. and is divided into Great and Little Ceram by the Isthmus of Taruno. Area, 7140 sq. miles. Pop. 195,000. Malays inhabit the coasts; Papuans the interior. A mountain chain runs through C., reaching in Núsa Keli 9950 feet. The soil is very fertile. The vegetable product include timber-trees, rice, sago, maize, sugar-cane, bananas, and edible roots. The Malays fish. Exports are Ceram clothing, textiles, iron, copper-wire, earthenware, birds of Paradise, trepang, sago, dried fish, edible nests, &c. C. belongs to the Netherlands.

CERAMBYX, a Linnæan genus of colopterous insects, included among those which, on account of the length of their antennæ, are usually known as LONG-HORNED BEETLES, and now generally ragarded as the type of a tribe or family. To this tribe belongs the Musk Beetle of England (*Callichroma moschata*), remarkable for its strong and agreeable odor, which, however, is rather that of roses than of musk. Some foreign species have the odor of musk in great perfection. *C. heros*, one of the largest European beetles, extremely rare in Britain, deposits its eggs in a hole which it excavates for that purpose in the wood of the oak; and the grub feeds upon the wood, excavating long passages through it.

CERAMIA'CEÆ, a sub-order of *Algæ* (q. v.), also called FLORIDEÆ, and consisting of sea-weeds of a rose or purplish color, with fronds formed of cells arranged in rows, sometimes in a single row; the *sporocarps* containing cells or *spores*, often in fours (*tetraspores*), with a transparent *perispore*, and enclosed in receptacles of very various form and structure. They are most abundant in the seas of the northern temperate zone. Many of them are very delicate and beautiful. A considerable number furnish agreeable articles of food of a gelatinous nature, as DULSE (q. v.), CARRAGEEN (q. v.) or IRISH MOSS, and certain species of PLOCARIA (q. v.) which are much used on the sea-coasts of the East Indies. The edible swallow's nests of the East are supposed to be formed of a sea-weed of this sub-order, a species of *Gelidium*.

CERA'MIC (Gr. *keramos*, potter's clay, from *kaio*, to burn, and *era*, earth), a term used to designate the department of plastic art which comprises all objects made of clay, such as vases, cups, basel-rilievi, cornices, and the like.

CERA'STES, or Horned Viper, a genus of serpents of the family *Viperidæ*, distinguished by a broad depressed heart-shaped head, the scales of which are similar to those of the back, and particularly remarkable for the development of one of the scales of each eyelid into a spine or horn, often of considerable length. The tail is very distinct from the body. This genus is exclusively African, and very venomous. The best known species, *C. vulgaris*, the Horned Viper of the north of Africa, was called *C.* by the ancients, the name being derived from the Greek *keras*, a horn. It was correctly described by the traveller Bruce, but his description was for some time regarded with incredulity. Other species of the same genus are *C. nasicornis* of the western coast of Africa, and *C. caudalis* of the Cape of Good Hope.

CE'RATE (Lat. *cera*, wax), a compound of wax with other oily and medicinal substances in such proportions as to have the consistence of an Ointment (q. v.). Simple C. is made by melting together equal parts of white wax and olive-oil; they are to be heated together, and carefully stirred into a uniform substance while cooling.

CE'RATITES, a genus of Ammonitidæ, peculiar to, and characteristic of, the Trias. They are distinguished from the other members of the family by having the lobes of the sutures serrated, while the intervening curves, directed towards the aperture, are simple. Twenty-six species have been described.

CE'RBERUS (Gr. *kerberos*), in Greek mythology, was the name of the many-headed dog—the offspring (according to Hesiod) of Typhon and Echidna—who guarded the portal of the infernal regions. Later writers describe C. as only three-headed, with the tail and name composed of serpents, though the poets sometimes encumber him with a hundred heads.—A northern constellation, near the hand of Hercules, was named Cerberus, by Hevelius.

CERCA'RIA, a name formerly given to a supposed genus of *Entozoa*, at first, from their minute size, mistaken for *Infusoria*, but now known to be the young of

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Trematode Worms. In the form to which the name C. was given, these creatures consist of an oval body with a thread-like tail; and swim about with great activity in water, but exhibit a strong instinctive propensity to penetrate into the soft bodies of insect larvæ, which they do by means of a spine-like weapon projecting from their head. The tail, as no longer needed, is now left behind, the closing of the wound through which the C. enters apparently nipping it off. Within the body which it enters, the C. loses also its spine, becomes encysted, and awaits its passive migration into an animal of higher kind, there to become a trematode worm. When it does not succeed in finding, in due time, a larva into which to enter, the C. gathers itself up into a ball; emits a mucous secretion, which soon hardens; and incessantly turning round within this mucous mass, becomes invested with a sort of shell, in which form it is not unlikely to be swallowed by some vertebrate animal. The C. is not the immediate off-spring of a parent like itself. It is generated in a curious little animated sac which is to be found buried among the organs of fresh-water mollusks, and within which this development of young takes place by gemmation. See GENERATIONS, ALTERNATION OF.

CERCELÉE, or Recercelée, in Heraldry, is a cross circling, or curling at the ends, like a ram's horn.

CE'RCIS. See JUDAS' TREE.

CERCOCE'BUS (Gr. tail-ape), a genus of monkeys, natives of Asia and Africa, included by some naturalists in the large genus *Cercopithecus*. These monkeys have large cheek-pouches, large callosities, and long tails. The species commonly called MANGABEYS, or WHITE EYELID MONKEYS, are commonly referred to this genus, besides the CALLITHRIX, or GREEN MONKEY, and the MALBROUK, or DOG-TAILED BABOON.

CERCOPITHE'CUS (Gr. tail-ape), a genus of monkeys, containing a large number of species, natives of Asia and Africa, but chiefly of Africa. They are called *Guenons* by French naturalists, but they have no common English name more distinctive than Monkey. They have cheek-pouches and callosities, and a long but not prehensile tail. A MONA, or VARIED MONKEY (*C. Mona*)—an African species—in the Parisian menagerie, was remarkable not only for the cunning and adroitness with which it searched and rifled the pockets of visitors, but also for the readiness with which it applied a key to the opening of a lock, untied knots, undid the rings of a chain, and performed other similar feats.

CERDO'CYON (Gr. cunning-dog), a genus of *Canidæ*, apparently intermediate between true dogs and foxes, natives of South America. They are sometimes called Aguara Foxes. Their aspect is thoroughly vulpine, as are also their manners. Some of them add to the dispositions of ordinary foxes a singular propensity to steal and secrete brilliant or gaudy objects. A Brazilian species has been known to carry pocket-handkerchiefs into the woods. Some are natives of the coldest parts of South America, and have a rich fur.

CERE. See BILL.

CERE'A, a town of North Italy, about 19 miles south-south-east of Verona. It is a straggling place, with the remains of an old castle. Pop. 5930. The Austrians defeated the French here in 1796.

CEREA'LIA, or Ce'rëal Grasses, so named from Ceres (q. v.), are the plants which produce grain or corn; in other words, all the species of grass (*Gramineæ*) cultivated for the sake of their seed as an article of food. They are also called CORN-PLANTS or BREAD-PLANTS. They do not belong to any particular tribes of the great order of grasses, but differ from each other botanically, perhaps as much as any plants within the limits of that order. The seeds of the grasses in general being indeed farinaceous and wholesome, the employment of particular species as bread-plants seems to have been determined chiefly by the superior size of the seed, or by the facility of procuring it in sufficient quantity, and of freeing it from its unedible envelopes. Some of the grains, as wheat and barley, are produced in ears or close-set spikes; some, as a few of those called millet, in spike like panicles; others, as oats and rice, in very loose panicles. The form and size of the grains vary not a little, some being roundish, and some elongated; maize is the largest; many of the

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millets are very small. The plants themselves vary in size almost as much as their seeds, the millets being the smallest, and maize the largest of ordinary corn-plants. —Buckwheat and Spurry are sometimes ranked with the C., but incorrectly, if the term is regarded as having any botanical limits, for they are not grasses; but their seeds are used in the same way. The Quinoa of South America, and the Kiery (*Amaranthus*) of India, with other plants of different orders, might be added to the list on the same account; even the Lotus of the Nile, the *Victoria regia*, and other species of water-lilies might thus be reckoned as cereal plants. The most extensively cultivated grains are Wheat (*Triticum*), Barley (*Hordeum*), Rye (*Secale*), Oats (*Avena*), Rice (*Oryza*), Maize or Indian Corn (*Zea*), different kinds of Millet (*Setaria, Panicum, Paspalum, Pennisetum*, and *Penicillaria*), and Durra or Guinea Corn (*Sorghum* or *Andropogon*). These have all been cultivated from time immemorial, and there is great uncertainty as to the number of species to which the many existing varieties belong; their original forms and native countries cannot confidently be determined. Barley, oats, and rye are the grains of the coldest regions, the cultivation of the two former extending even within the arctic circle. Wheat is next to these, and in the warmer regions of the temperate zone its cultivation is associated with that of maize and rice, which are extensively cultivated within the tropics. The millets belong to warm climates, and durra is tropical or sub-tropical. Rice is the food of a greater number of the human race than any other kind of grain. Maize has the greatest range of temperature.—Besides these, other grasses are cultivated to some extent, in different parts of the world, for the grain they yield: a species of *Eleusine* (Mand) in India, and another (Tocusso) in Abyssinia; a species of *Poa* (Teff) in Abyssinia, and a species of *Coix* (Job's Tears) in India. Canary Grass (*Phalaris*) may also be named. Canadian Rice (*Zizania*) is used as a grain, but is scarcely cultivated, and the same remark applies to the Manna Grass (*Glyceria*) of the north of Europe, to some species of Bamboo (*Bambusa*), and to the Sea Lyme Grass (*Elymus*), which affords an esteemed article of food, in small quantity, to the inhabitants of Iceland.

Of all the C., wheat is by common consent admitted to be that of which the grain is best fitted for the making of bread, although others are to some extent employed for this purpose. But some, as rice and maize, are scarcely suited for it, and other methods are chiefly employed of preparing them for food. All the grains are also used to produce some kind of fermented liquor or beer, and spirituous liquors are obtained from them by distillation.

CEREBE'LLUM. See CEREBRUM.

CE'REBRINE, or Ce'rebric Acid, is an organic acid of very complex composition, found in the liver, blood, and nerves, but especially the brain of animals.

CE'REBRO-SPI'NAL FLUID. There is an interval, termed the *Sub. arachnoid Space*, lying between the two innermost of the membranes of the brain and spinal cord—viz., the arachnoid and the pia mater. This space, which is narrow on the surface of the cerebral hemispheres, but is comparatively wide at the base of the brain between the two middle lobes of the cerebrum, and, posteriorly, between the hemispheres of the cerebellum and the medulla oblongata, is occupied by the C. F., which fills up the interval between the arachnoid and pia mater, and keeps the opposed surfaces of the former membrane (which is a closed serous sac) in contact. The C. F. is a clear, limpid, slightly albuminous fluid, having a saltish taste, and a faintly alkaline reaction, and not containing more than 1·5 per cent. of solid matters. It varies in quantity from two to ten ounces, and is said to be most abundant in aged persons. Its chief use is to afford mechanical protection to the nervous centres, and to prevent the effects of external shocks or concussions.

CE'REBRUM, Cerebe'llum. Cerebrum (Lat. the brain) is sometimes applied to the whole contents of the cranium or skull; but more usually it denotes the upper portion, while the under and posterior portion is called the CEREBELLUM, or little brain. In this article we shall briefly notice the chief results which have as yet been obtained regarding the uses of the various parts of the mass, referring to the article BRAIN for the necessary anatomical details.

The *crura cerebri* appear as the principal conductors of impressions to and from the cerebrum. When one is divided, the animal moves round and round, from the injured toward the sound side, as if from a partial paralysis of the latter side. The

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effect may be referred to the interruption of the voluntary impulses from the C., for although the cerebellum seems to have the office of combining the muscles, whose co-operation is necessary for each action, the effort of the will must proceed from the cerebrum.

The *corpora quadrigemina* are, as stated in the article BRAIN, "analognes of the optic ganglia of the lower animals." Their removal wholly destroys the power of seeing, and diseases by which they are seriously affected are usually accompanied with blindness. Disease or destruction of one *corpus quad.* produces blindness of the opposite eye. Probably their connection with vision is not their only function.

The *optic thalami* probably participate slightly in the visual function of the corpora quadrigemina; but we have no definite evidence on this point. They are intimately connected with the power of movement. Destruction of one of them causes rotation of the animal, similarly to division of one of the crura cerebri. Longet has shewn, that after removing all the cerebral hemispheres and the *corpora striata*, the animal can still stand and walk, but that on removing one of the optic thalami, it falls down paralysed on the opposite side, or commences rotatory motion.

The function of the *corpora striata* is very uncertain; they have probably some connection with sensation and volition, the precise nature of which is at present unknown.

The parts hitherto considered—including the cerebellum—appear to comprise the apparatus (1.) For the direction and government of all the unfelt and involuntary movements of the parts which they supply; (2.) For the perception of sensations; and (3.) For the direction of such instinctive and habitual movements as do not require the exercise of any reasoning or intellectual act. They cannot be regarded as organs of the higher faculties of the mind.

The functions of the *cerebral hemispheres* are, in the words of Dr. Kirkes ("Handbook of Physiology"), those of organs by which the mind, *1st*, perceives those clear and more impressive sensations which it can retain and judge according to; *2d*, performs those acts of will, each of which requires a deliberate, however quick, determination; *3d*, retains impressions of sensible things, and reproduces them in subjective sensations and ideas; *4th*, manifests itself in its higher and peculiarly human emotions and feelings, and in its faculties of judgment, understanding, memory, reflection, induction, and imagination, and others of the like class.

"The evidences that the cerebral hemispheres are, in the sense and degree indicated above, the organs of the mind, are chiefly these: 1. That any severe injury of them, such as a general concussion, or sudden pressure by apoplexy, may instantly deprive a man of all power of manifesting externally any mental faculty; 2. That in the same general proportion as the higher mental faculties are developed in the vertebrate animals, and in man at different ages, the more is the size of the cerebral hemispheres developed in comparison with the rest of the cerebro-spinal system; 3. That no other part of the nervous system bears a corresponding proportion to the development of the mental faculties; 4. That congenital and other morbid defects of the cerebral hemispheres are, in general, accompanied with corresponding deficiency in the range or power of the intellectual faculties and the higher instincts." See MIND, THE HUMAN.

Cerebellum.—The functions of this organ have been made the subject of much discussion and investigation. It is itself insensible to irritation, and has been cut away in various animals (by Longet and other French physiologists), without eliciting signs of pain; moreover its removal or disorganisation by disease is generally unaccompanied with loss or disorder of sensibility, animals from whom it has been removed being apparently able to smell, see, hear, and feel, as perfectly as before. Flourens seems by his vivisections to have arrived at the correct view regarding the functions of this organ, and his results have been fully confirmed by Longet and others. He extirpated the C. in birds by successive layers. Feebleness and want of harmony of the movements resulted from the removal of the superficial layers; when he reached the middle layers, the animals became restless; their movements were violent and irregular; but they were not convulsed, and their sight and hearing were perfect. By the time that the organ was entirely removed, the animals had completely lost the power of flying, walking, standing, and preserving their equilibrium. When a pigeon in this state was laid

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upon its back, it could not recover its former position; but fluttered its wings, and saw and tried to avoid a threatened blow. Hence volition, sensation, and memory were not lost, but merely the faculty of combining the actions of the muscles. From a large series of experiments of this kind, subsequently made on all classes of animals, Flourens infers that the C. belongs neither to the sensitive nor to the intellectual apparatus; and that it is not the source of voluntary movements, although it belongs to the motor apparatus; but that it is the organ for the co-ordination of the voluntary movements, or for the excitement of the combined and harmonious action of the muscles.

This view is confirmed by the phenomena observed in certain cases of disease, and to a certain extent by comparative anatomy, for to each of the four classes of vertebrata—if we reckon amphibians and reptiles as a single class—the species whose natural movements require the most rapid and exact combinations of muscular actions are those in which the the C. is most developed in proportion to the spinal cord; and if we compare different species of the same class, we usually find the development of the C. to correspond very closely with the perfection and variety of the muscular movements. For example, in the frog the movements are exceedingly simple in character, consisting of little else than flexion and extension of the posterior limbs; and the C. of this animal is extremely small compared with the rest of the brain, being merely a thin narrow band of nervous matter. In the common sea turtles the movements of the body are of a more varied character, and the motions of the head and neck are more extensive; and here we have a much more highly developed cerebellum. In the alligator, again, a reptile whose motions closely resemble those of quadrupeds, the C. is still more fully developed.

The influence of each half of the C. is directed to the muscles of the opposite side of the body, and for the right ordering of the movements, the actions of its two halves must be mutually balanced and adjusted; for if the nervous structures uniting one of the halves of the C. with the medulla oblongata and spinal cord be divided, strangely disordered movements occur, the animal falling down on the side opposite to that which has been injured, and continually rotating round the long axis of its body, sometimes for several days, at the rate of fifty or sixty times in a minute. Similar movements have been observed in men in whom one of the crura of the C. has been diseased.

Phrenologists are of opinion, in accordance with the view originally propounded by Gall, that the C. is the seat of the sexual impulse and instincts; but this view has been long abandoned by almost all physiologists, for the reason that it has not been found to be sufficiently supported by anatomical and experimental facts, many of which are indeed directly opposed to it.

Our limited space compels us to leave altogether untouched many most interesting topics in Cerebral Physiology, as, for instance, the duality of the brain, the plurality of the cerebral organs, &c. The reader who wishes for further information, is referred to Kirkes's "Physiology" (from which we have freely quoted), Carpenter's "Human Physiology," Noble "On the Brain," Holland's "Chapters on Mental Physiology," and Brodie's "Psychological Inquiries."

CE'REMONY (Fr. *Cérémonie*; Lat. *Cerimonia*, a sacred rite). Almost any act, when performed in a regular, orderly, and formal manner, and when viewed, not with reference to its object, but the mode of its performance, becomes a C.; and the more entirely the attention of the performers is withdrawn from the object of the act, and fixed upon the manner of its performance, the more *ceremonious* does it become. The purely formal character of C. is thus illustrated by Hooker: "The name ceremony," he says, "we do not use in so large a meaning as to bring sacraments within the compass and reach thereof, although things belonging to the outward form and seemly administration of them are contained in that name." The remark is applicable to the most trivial ceremonies of social life and of state pageantry, as well as to the most sacred rites of religion, for a C. which is its own object would scarcely be entitled to be regarded even as a ceremony. The most empty display has always the ulterior object of imposing on somebody.

Ceremonies may be divided into four classes: 1. Religious ceremonies; 2. Social ceremonies; 3. State ceremonies; 4. International ceremonies.

Religious and state ceremonies will be treated of respectively under their various denominations; see, for the first, RITES, LITURGY, MASS, PROCESSIONS, &c.; and

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for the second, CORONATION; COURT; COURT, PRESENTATION AT; PARLIAMENT; &c. Social C. will in a great measure fall under the heads, ETIQUETTE, PRECEDENCY, COURTESY, FORMS OF ADDRESS, &c.; and international C. under DIPLOMACY, CONSUL, AMBASSADOR, &c.

CEREO'PSIS (Gr. wax-face), a genus of birds of the family *Anatidæ*, to which the New Holland goose (*C. Novæ Hollandiæ*) belongs. This bird has been known since the southern shores of that country were first visited by navigators. There, and on the adjacent islands, it is found in great abundance; and the earlier navigators easily supplied themselves with fresh provisions by knocking them down with sticks, so little were they acquainted with the danger to be apprehended from man. The cere is remarkably large, whence the name.

CE'RÉS, among the Greeks named *Demeter*, daughter of *Chronos* (Saturn), by *Rhea* (Ops), sister of Jupiter, Neptune, Juno, &c. She had the misfortune, along with her other brothers and sister, to be devoured by her father, who, however, vomited her forth again after taking the emetic which Metis gave him. By her brother Jupiter she became the mother of Persephone or Proserpina (q. v.). The chief myth relating to C. tells how her daughter Proserpina was stolen by Pluto, and how the mother wandered far in quest of the maiden. After travelling in human form nine days, and everywhere distributing her gifts to mankind, she excited the pity of Jupiter, by whom Mercury was despatched to bring back Proserpina from the infernal world, but on the condition that she must spend there a third part (or, as others say, one-half) of every year. The myth of C. was symbolical of the growth of grain; some consider that this is intimated in the name Demeter, which is thought to be equivalent to *ge meter*, "Mother Earth." The relations of the worship of C. with agriculture, social order, &c., were expressed in her two great festivals—the *Eleusinia* (q. v.) and *Thesmophoria* (q. v.). C. was especially worshipped in Crete, Delos, Sicily, Asia Minor, Arcadia, Argolis, and Attica. Bulls, cows, pigs, honey-cakes and fruits were offered to her. Among the Romans her festivals were styled CEREALIA; and of these the most interesting was the feast celebrated by the rural population shortly before harvest, when the country people, dressed in white and crowned with oak leaves, danced and sang harvest songs in honor of the goddess. The feast in April lasted several days, and was celebrated by games of the circus. C. was represented most commonly in a chariot drawn by dragons, having her head crowned with a garland of corn ears and holding a torch, a basket, or a poppy in her hand.

CERES, one of the Planetoids (q. v.), and the first of them that was discovered. It was first seen by Piazzi at Palermo, January 1, 1801. He continued to observe its motion till the 13th of February, when illness obliged him to discontinue his observations, which, however, sufficed to enable astronomers approximately to calculate its orbit. It was nearly a year after before it again became visible, owing to its approach to the sun. C.'s magnitude is less than that of the moon; and it looks like a star between the seventh and eighth magnitudes.

CE'REUS, a genus of plants of the natural order *Cacteæ* (q. v.), containing about 100 known species, among which are some of the most splendid flowers of that order. One of these is *C. speciosissimus*, now one of the most common green-house plants in Britain, and sometimes cultivated even in windows. Its large flowers are of a fine scarlet color, the inner petals with a violet tinge: they spring singly from the younger branches. The fruit, when well ripened, is of a delicious flavor. The plant is a native of Mexico.

CERIGNOLA, a town of Italy, in the province of Foggia, 23 miles south-east of Foggia. It is divided into two parts—the old and new town, in the former of which a portion of the ancient walls still remain—and is celebrated for the decisive victory obtained over the French by the Spaniards in 1503, and which established the supremacy of Spain in Naples. C. has manufactures of linen, and a trade in cotton and fruits. Pop. (1871) 25,131.

CERIGO, one of the smaller of the seven Ionian Islands, was anciently called Cythera; is situated in the Mediterranean, and is separated from the coast of Morea by a narrow strait; lat. 36° 28' n., long. 23° e. It has an area of 107 square miles, with a population in 1870 of 10,687. With the exception of a few tracts of land, it is a very barren, dry, and mountainous island. In some parts, however,

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corn, wine, and olive-oil are raised. There are two great caverns in the island—one in the sea-cliff at the termination of the wild glen of Milopotamos; the other, known by the name of the Cavern of St Sophia, from a small chapel at its mouth dedicated to this saint, is situated at about one and a half hour's ride from Capsali (q. v.), the capital of the island. The former cavern is said to be three miles in length, and so low that it is necessary to creep, in many places, on hands and knees to explore it. The latter—that of St Sophia—is a very remarkable one, and possesses singular beauty; it abounds in enormous stalactites of various shapes and great beauty. In ancient times, C. was sacred to Venus, being, according to the old mythology, the island that received this goddess when she arose from the sea.

CERI'NTHUS (abusively named, Merinthus, i. e., a halter), a heretic, who lived at the close of the apostolic age, but of whom we have nothing better than uncertain and confused accounts. It is said that he was a Jew by birth, and studied philosophy in Alexandria. From Egypt he passed into Asia Minor, and lived in Ephesus contemporaneously (according to the belief of the church) with the aged apostle John. Tradition tells us that John held the heretic in such detestation, that, on a certain occasion when he encountered C. in the baths of Ephesus, he immediately left the place, saying to those about him: "Let us flee home, lest the bath should fall while Cerinthus is within." It was believed in the ancient church, that the Gospel by St. John was written in opposition to the tenets of C.; and the Roman presbyter Caius (about the close of the 2d c.) supposed that C. had revenged himself by falsely ascribing the authorship of the Apocalypse to St. John—it being in reality his own work! The Fathers contradict one another in their accounts of Cerinthus. Some describe him as a complete Gnostic, in which case he would be the earliest recorded teacher of that sect; others say that he held coarse and sensual millenarian views, making the *millenium* (q. v.), with the licentious fancy of an Arab, consist chiefly in "nuptial delights;" and that he believed the Jewish ceremonial law to be in part binding upon Christians. There can be no doubt that C. made use of the Jewish law at least as a symbol for his Gnostic doctrines, and also employed millenarian terms in a symbolical manner; a very natural thing for him to do, on the hypothesis which Neander and others have suggested—that Gnosticism originated, not among the minds which had received a true Hellenic culture, but among the Judaising sects, whose theosophy was a jumble of the spiritual and the material. C. being the oldest teacher of Judaico Gnostic principles, there would naturally be a greater incongruity and want of harmony in his language and ideas than characterized Gnosticism at a later period of its development; and subsequent ecclesiastical writers, destitute as all of them were of precise historical knowledge and sound principles of criticism, could hardly avoid misunderstanding a system which is not consistent throughout, but bears evident marks of being formed in a transition epoch.—Paulus, "Historia Cerinthi" (Jena, 1799); Neander, "Kirchengeschichte," vol. i., part 2.

CE'RITE, or O'chröite, is the *Silicate of Cerium*. It is found as a mineral in gneiss, at Westmanland, Redderhyttan, and Bastnäs. It contains in 100 parts—silica, 16; peroxide of cerium, 26·55; oxide of lanthanum, 33·38; carbonic acid, 4·62; alumina, 1·63; peroxide of iron, 3·53; lime, 3·56; oxide of manganese, 0·27; and water, 9·1. It occurs in granular pieces of a clove-brown, cherry-red, or gray color, with a white streak, a splintery fracture, an adamantine lustre, and is translucent at the edges.

CERI'THIUM, a genus and the type of a family, *Cerithiadæ*, of gasteropodous mollusca of the order *Pectinibranchiata* of Cuvier. The shell is spiral, elongated, and many-whirled, with an oval oblique aperture which has a short canal in front. The species of this family are numerous, most of them marine, but many inhabiting estuaries and brackish rather than salt water; some are found in lakes and rivers. A few belong to temperate climates, but most of them are tropical, and in mangrove swamps they particularly abound. The fossil species are very numerous, almost all limited to the tertiary formations. See BAGSHOT BEDS.

CE'RIUM is a rare metal found native in Cerite (q. v.) and a few other minerals. It is a white metal, has not been obtained in any quantity, is not therefore employed in any manufacture, and forms two oxides and a numerous class of salts.

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CEROPLA'STIC (Lat. *cera*, wax), the art of modelling in wax. See WAX-WORK.

CEROSTRO'TUM, or Cestro'tum (Lat.); a species of encaustic painting upon horn or ivory, the lines of the design being burned in with the *cestrum* or burning needle, and wax introduced into the furrows thus made.

CERO'XYLON. See WAX PALM.

CERRE'TO, a town of South Italy, in the province of Benevento, situated on the slope of the Apennines, about 22 miles north-east of Capua. Is is a well-built town, with a cathedral, and manufactures of coarse cloth. The district produces good wine. Pop. 6469.

CE'RRO GO'RDA, the name of several localities of Spanish America.—1. A plateau in Mexico, the most easterly on the route from Vera Cruz to the capital. Here, on 18th April 1847, the Americans totally defeated the Mexicans.—2. A city of Peru, the capital of the province of Pasco, in the department of Junin. It is in the vicinity of the richest silver-mines in the republic; and standing at an elevation of 14,100 feet, it has, all the year round, the temperature of an English winter. The estimates of population range from 7000 to 16,000. C. G. is 140 miles to the north-east of Lima.

CERTA'LDO, a market town of Central Italy, is picturesquely situated on the Elsa, about 18 miles south-west of Florence. It is noteworthy as the residence of Boccaccio, as well as the scene of his death. His house, surmounted with a tower, is still standing, and contains the articles of furniture belonging to the poet's time, and a fresco painting of him by Benvenuto Cellini. Pop. 6562.

CERTHI'ADÆ, a family of birds, generally placed in the great order *Insessores* or *Passerinæ*, and tribe *Tenuirostres*, although some naturalists have ranked them in the order *Scansores*. They mostly live on the trunk and branches of trees, feeding on insects which they find in the crevices of the bark; and many of them aid themselves by their stiff tail-feathers in retaining their position as they search for their food on the perpendicular stem. Their claws are long and sharp; the hind-toe is also elongated, so that they can take firm hold of the bark or of a small branch; and many of them can pass round a horizontal branch, clinging to its under-surface with their backs to the ground. The bill of many is slender and curved; others, however, have a comparatively short and straight bill. The tongue is cartilaginous at the extremity, and so fitted to aid in seizing insect prey. The plumage is usually dull and uniform; but the birds are lively and active in their habits. The species are numerous and widely diffused; they are divided into a number of genera. All of them are small birds. The Creepers (q. v.), forming the genus *Certhia*, are regarded as exhibiting the type of the family. Wrens and Nut-hatches, although referred to it, depart very considerably from this type. Many small tropical and subtropical birds, which live by sucking honey from flowers, formerly referred to this family, are now separated from it.

CERTI'FICATE, a written testimony to the truth of a certain fact or facts. The law of England recognizes certificates for various purposes. 1. Annual C. of attorneys. See ATTORNEY. 2. C. of appointment of the creditors' assignees to a bankrupt's estate and effects. 3. C. of conformity of a bankrupt. 4. C. of counsel, to enable a pauper to litigate in *forma pauperis*. 5. C. of the judges of the superior common-law courts at Westminster, which are of various kinds and for various purposes. 6. C. of registry of a ship; which is a copy of what is entered in the register of the ship in the books of the Custom-house. This C. is granted by the collector, comptroller, or principal officer of the Customs at the port of registry, and delivered to the captain as a voucher of the character and privileges of the vessel as a British ship.

CERTIFICA'TION, in the law of Scotland, signifies the judicial assurance given to a party of the course to be followed by the judge in case he disobeys the will of a summons, or other writ or order of the court. Reiterated contumacy on the part of the defender was at one time punished with confiscation of his property (1449, c. 29), but now C. amounts to nothing beyond an intimation that if he fails to appear in the usual manner, the judge will decern, or pronounce judgment against him. The most important C. is in the process of Reduction-improbation (q. v.). In this action, two terms are allowed for the production of the deed called for, and sought to

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be reduced. Thereafter, an additional ten days are given; but should production not be satisfied on their expiry, decree of C. will be pronounced, and this decree has the effect of declaring the deed to be forged and fabricated. Such a decree, even though pronounced in absence, can hardly be recalled. In simple reduction (see REDUCTION), the C. is only to the effect that the deed shall be void and null, till produced.

CE'RTIFIED COPY. See EVIDENCE.

CERTIORA'RI (Lat. to be certiorated, or more fully and accurately informed of), in English law, is an original writ issuing, in civil cases, out of the common-law jurisdiction of the Court of Chancery, and in criminal, from the criminal side of the Court of Queen's Bench. This writ, which runs in the Queen's name, is addressed to judges or officers of an inferior court, commanding them to certify or to return the records of a cause depending before them, in order that the party may obtain more sure and speedy justice, from such justices as shall be assigned to determine the cause. A writ of C. may be granted at the instance either of the prosecutor or defender; but, to prevent its being used as an instrument of oppression by the one party against the other, it is provided (5 and 6 Will. IV. c. 33, and 16 and 17 Vict. c. 30) that either party, before applying for it, must obtain the leave of the court, and enter into recognisances.

The writ passes on a *Bill of C.*, which states the proceedings in the inferior court, so far as they have gone; sets forth the alleged ground of incompetency, by suggesting that the cause is beyond the jurisdiction of the court, that the defendant or witnesses live beyond it, or the like reason why substantial justice cannot be done; and then prays the writ to certify and remove the cause into the superior court. When the bill is filed, the writ of C. is obtained on motion.

CERTO'SA DI PA'VIA, La, one of the most celebrated monasteries in the world, is situated in the neighborhood of Pavia, and was founded, 1396, by Giovanni Galeazzo Visconti, first Duke of Milan, to appease his conscience for the murder of his uncle. The church is a splendid structure in the form of a Latin cross, the ground-plan being 249 feet long by 173 feet broad. It has altogether 19 chapels, 7 in the whole length of the church, and 5 in the transept, some of which are decorated with fine frescoes and paintings. The richly sculptured arcade, designed by Ambrogio de Fossano, named Borgognone, was commenced in 1478. The building is made up of various styles, but the pointed prevails in the interior, which is decorated with frescoes, paintings, &c., by Dan Crespi, Andrea Solari, Campi, and Ambrogio Fossano, and contains a gorgeous high-altar, the mausoleum of the founder, and several monuments.

CERU'MEN. This term is applied to yellow waxy matter which is secreted by certain glands lying in the external auditory canal, or the passage that leads from the external opening of the ear to the membrane of the tympanum. Its main use, doubtless, is to lubricate this passage. It possesses a peculiarly bitter taste, and some physiologists have believed that in consequence of this property it prevents insects from entering the auditory canal. It is popularly known as ear-wax.

CE'RUSE, or White-lead, the basis of white oil-paint, is a *carbonate of lead*. It has several other names—krems, Nottingham white, flake-white, &c. Like all other preparations of lead, C. is liable to be acted upon by exhalations from sewers, or by anything which contains sulphuretted hydrogen, in which case it is changed to a dull and leaden hue. Neither will it bear to be mixed with any pigment containing sulphur, such as vermilion. It is supposed that the white oxide of zinc might be substituted for C. as a white pigment with advantage.

CERVA'NTÉS SAAVE'DRA, Miguel de, one of the greatest imaginative writers of Spain, was born of an old Galician family, at Alcala de Henares, October 9, 1547. He studied at Salamanca, and afterwards at Madrid, where he was placed under the care of a learned theologian, Juan Lopez de Hoyos, who was then professor of belles-lettres in the university. But his natural love of poetry led him to spend most of his time in writing elegies, ballads, sonnets, and a pastoral romance entitled "Filena." When 22 years old, C. served for some time as valet-de-chambre to Cardinal Giulio Aquaviva of Rome. In 1570 he served as a volunteer under the command of the papal admiral, Marco Antonio Colonna, and fought gallantly

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against the Turks. At the battle of Lepanto, he was maimed for life by a gunshot wound in the left hand. He afterwards took part in various campaigns. Captured by an Algerine Squadron, he was made a slave, but was ransomed in 1580, after a four years' captivity. On his return to Spain, he rejoined his regiment in the army sent by Philip II. to support his claims in Portugal, and distinguished himself in the expedition to the Azores. In 1584 he returned to Spain and retired into private life, to devote his attention to literature. Soon after his publication of the pastoral romance "Galatea" (1584), he married, commenced writing for the stage, and produced in the course of a few years as many as thirty dramatic pieces, of which the tragedy "Numancia" is the most remarkable. During the years 1588—1599 he lived in straitened circumstances in Seville. In 1605 he once more appeared as an author, and now in a sphere exactly suited to his genius. In his immortal work "Don Quixote," C. intended to put an end to that taste for extravagant romances of chivalry which had so long prevailed. The first part of this great satirical work appeared in Madrid, and was received at first coolly, but soon afterwards with loud applause, which at a later period was echoed from all parts of educated Europe. "Don Quixote," though written with a satirical purpose, is throughout pervaded by the true spirit of poetry. With that universality which belongs to the highest genius, C. connected a universal human interest with descriptions of local and temporary characteristics. He did not intend by his "Don Quixote" to burlesque the old Spanish knight-errantry, for, as Mr. Ford remarks (see "Handbook of Spain," part i., p. 238), "the thing had expired a century before his birth;" but to put an end to the absurd and affected romances which it was then the fashion to read, and which were believed to be true pictures of chivalry. He had also, it is quite clear, another object in view—viz., to shew that the deeper and truer and more guileless a nature is, the more will it become the jest and butt of real life; but he likewise teaches us that the pure heart and the high soul obtain a triumph which misfortunes and blunders cannot tarnish; for the knight, always "disinterested, generous, elevated, and beneficent," though "the sweet bells of his intellect are jangled and out of tune," maintains throughout a firm hold on our affections and esteem. Charles Lamb has truly said, that readers who see nothing more than a burlesque in "Don Quixote," have but a shallow appreciation of the work.

Though received with enthusiasm, "Don Quixote" brought no pecuniary reward to the author. He was left in the obscurity and poverty in which he had passed so many years, and vainly endeavored to improve his circumstances. After silence during several years, C. published his twelve "Novelas Exemplares" (Exemplary Tales), 1613; his "Viage al Parnaso" (Journey to Parnassus), 1614—his next best production to "Don Quixote;" and in the following year he produced eight new dramas, but these were indifferently received. In 1614, a certain Alonzo Fernandez de Avellaneda published at Tarragona, in 1614, a so-called continuation of "Don Quixote," which was made a vehicle of abuse lavished on Cervantes. It appears that C. suffered considerably under these despicable attacks; but he revenged himself in noble style by publishing (1615) the *true* continuation of "Don Quixote." Near the close of his career, C. found a patron in the Count of Lemos, who relieved his poverty. During the last few years of his life, he resided in Madrid, where he died, April 23, 1616. No stone marks the spot where his remains were interred. His novel, "The Sorrows of Persiles and Sigismunda," was posthumously published. In 1835, when the house in which the poet had lived in Madrid was rebuilt, a bust of C., by the sculptor Don Antonio Solá, was placed in the front.

Among the several editions of "Don Quixote" we may mention the splendid one in 4 vols. (Madrid, 1780); that by Pellicer (5 vols., Madrid, 1798); the fourth published by the Madrid Academy, with an admirable life of C. by Navarette (5 vols., Madrid, 1819); Diego Clemencin's edition, with the most complete commentary (6 vols., Madrid, 1833—1839); and a good pocket-edition, published at Leipsic (6 vols., 1800—1807). Of the collected works of C., an edition, not containing the comedies, appeared at Madrid (16 vols., 1803—1805); and another, without the "Journey to Parnassus," was published in the same city (11 vols. 1829). Don Ang. Garcia de Arrieta published a selection from the works of C. (10 vols., Paris, 1826—1832); and a reprint of the collected works is included in Baudry's "Coleccion de los Mejores Autores Españoles" (Paris, 1840—1841). England has been fertile in translations

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of C.'s immortal work. The first is that of Thomas Skelton (1612—1620), in addition to which may be mentioned those of Philips, Motteux, Smollett, Durfey, Jarvis, Wilmot, and Clark. The best are those of Skelton, Jarvis, and Clark.

CERVE'RA, a town of Spain, in the province of Barcelona, 28 miles east of the city of Lerida. It is situated on an eminence, is surrounded by old walls pierced with nine gates, and the west approach is commanded by a castle, which is now in a ruinous condition. The university of Lérida was removed here by Philip V., but it was afterwards transferred to Barcelona. The university building, a massive but unsightly edifice, is still standing. C. has manufactures of linen, woollen, and cotton fabrics. Pop. 5300.

CERVE'TERÉ, or Cerve'tri (ancient Cære or Agylla), a town of Central Italy, 27 miles west of Rome. Though now a place of some 700 or 800 inhabitants, it was formerly one of the most important cities of Etruria, possessing, it is said, a famous collection of paintings before even Rome was founded. Many Etruscan remains of value have been found here.

CE'RVIA, a town of Central Italy, situated on the Adriatic, 13 miles south-south-east of Ravenna. It is regularly built, has a cathedral and several convents; and from a marsh in the neighborhood about 50,000 tons of salt are annually obtained, the salt-works employing a considerable number of the population, which is about 6,000.

CE'RVIDÆ and Ce'rvus. See DEER.

CERVIN, Mont (Ger. *Matterhorn*; Ital. *Monte Silvio*), a mountain of the Pennine Alps, about 40 miles east-north-east of Mont Blanc, and between the Valais in Switzerland and the Val d'Aosta in Piedmont. Above an unbroken glacier line of 11,000 feet high, it rises in an inaccessible obelisk of rock, more than 3000 feet higher—and is described by the late Professor Forbes as the most striking natural object he had ever seen. The total elevation of the mountain is 14,836 feet. The Col of Mont C., used as a passage for horses and mules in summer, has an elevation of 10,938 feet.

CERVINA'RA, a town of Italy, in the province of Avellino, 12 miles north-west of Avellino. It has a convent and several churches, and a trade in the produce of the district. Pop. 2328.

CE'SARI, Giuseppe (sometimes called Giuseppino, or Il Cavaliere d'Arpino), an Italian painter, was born at Rome, 1570, and died there in 1640 (or 1642). He was greatly honored by no less than five popes, and his paintings were always highly popular. His works—in fresco and oil—display lively imagination, gay coloring, and great tact in execution; but are deficient in natural simplicity, correctness of design, symmetry of arrangement, and dignity of style. As he was the most brilliant of the mannerists, he was the chief object of the attacks made by the artistic reformers, Caravaggio, the Caracci, and their followers—who constituted the *naturalisti*—on the conventional or pseudo-idealistic style of painting.

CESARO'TTI, Melchiore, an excellent Italian poet, was born at Padua, 15th May 1730, and died 3d November 1808. He gained a reputation by the vigor and originality of his style, especially in his translation of Macpherson's "Ossian" (3 vols, Padua, 1763). The versification of this work, like that of C.'s free translation of the "Iliad," under the title of "La Morte di Ettore," was admired by Alfieri. C. unquestionably threw fresh life into Italian literature, but few in this country will consider his enthusiasm very rational, when it could induce him to think poor Macpherson a better poet than Homer. C.'s best work was his "Saggio sulla Filosofia delle Lingue" (Padua, 1785), written in opposition to the academical pedantry of La Crusca. His prose style is vigorous, but full of innovations, especially Gallicisms.

CESE'NA, a town of Central Italy, about 12 miles south-east of Forlì, on the Emilian Way. It is pleasantly situated on the hill-slope, washed by the Savio. Its principal buildings are the *Palazzo Pubblico*, the Capuchin church, and the library founded by Domenico Malatesta Novello, in 1452, with a rich collection of MSS. There are many monasteries and nunneries, as befits a place that gave birth to two popes—Pius VI. and VII. It has some silk factories, with a trade in wine and silk: and in the vicinity are productive sulphur-mines. Pop. (1872) 35,870.

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CESS, probably a corruption for *assess*, from the Ital. *assessare*, to impose a tax. It has long been used in England as synonymous with the more modern noun *assessment*. Camden, in the time of Elizabeth, speaks of every man being "cessed by the pole, man by man, according to the valuation of their goods and lands." See LAND-TAX.

CE'SSIO BONO'RUM (Lat. cession or surrender of goods), a process which the law of Scotland has borrowed from that of Rome, and which, like many others, is common to it with most of the continental systems. A C. B. may be defined to be an equitable relief from the severity of the earlier laws of imprisonment for debt, granted to a debtor in consideration of a cession of his goods to his creditors. The jurisdiction in cessios formerly belonged exclusively to the Court of Session, but by 6 and 7 Will. IV. c. 56, it was extended to sheriffs. The principal regulations, with reference to this process, at present in force, are the following: Any debtor in prison, or who has been in prison, or even against whom a warrant of imprisonment has been issued, may apply for a Cessio Bonorum. In his petition, he sets forth his inability to pay his debts, and his willingness to surrender his estates, and prays for interim protection. This petition must be intimated in the "Gazette." The bankrupt then lodges with the sheriff-clerk a state of his affairs, subscribed by himself, with all the relative books and papers. On a day appointed for the purpose, he is examined before the sheriff on oath; and if his creditors object to the petition, they are heard, and a proof, if necessary, allowed them. Whatever order the sheriff may pronounce is subject to review by the Court of Session, or a Lord Ordinary in vacation. Cessios originating in the Court of Session are sued out in the form of a summons, by which all the creditors are called as defenders to the action. Any one or more of them may appear; and the pursuer will not be allowed the benefit of the process, till he has satisfied the court that his insolvency has arisen from misfortune, and that his disclosure of the state of his affairs is full and honest. The burden of proving objections to his statements, and to the evidence which he may produce, will be laid on the creditors. If the debtor can find caution (q. v.) to attend all diets when called on, the sheriff or the Court of Session may grant him liberation or protection whilst the process is pending. A decree of C. B. operates as an assignation of the debtor's movable estate in favor of a trustee for behoof of the creditors. These trustees, like those in sequestrations, are now placed under the supervision of the Accountant in Bankruptcy. A C. B. differs from a Sequestration (q. v.) in this, that it confers no power on the bankrupt to insist on his discharge, and affords no protection against the attachment of his subsequent acquisitions by his creditors. The debtor has the privilege of retaining his working tools; but nothing beyond what is necessary for mere aliment will be allowed, even to half-pay officers and clergymen.

CE'STIUS, Pyramid of, a Roman monument of the Augustan age, situated close to the Porta San Paolo, partly without and partly within the walls of Aurelian. It is known to every English traveller, being in the immediate vicinity of the cemetery where Protestants dying in Rome are buried. The exterior form is perfectly preserved; but of the paintings which formerly decorated the internal walls, only a few traces remain. Several copies of these paintings have been made, of which we may mention those edited by Falconieri, 1661. The pyramid is 125 feet high, 100 feet in width at the base; the walls 25 feet thick. It is built of brick and tufa, faced with slabs of Carrara marble, now perfectly black with age, and rests on a base of travertine 3 feet high. The interior contains burial-chambers of considerable extent. The inner walls are covered with hard stucco, and the roof is vaulted. Both the walls and the roof were covered with paintings of female figures. The memory of the Caius Cestius for whom this pyramid was built has perished, but it has been supposed that he was the Cestius whom Cicero—in the oration *pro Flacco*—mentions as a rich man of business, who, having no children, left a large sum of money for the erection of a monument to himself. Two fluted columns of white marble, now standing before the pyramid of C., with their bases and two other bases, were discovered in the excavations of 1663, at the foot of the pyramid. In the cemetery, the remains of several celebrated men have their resting-place, among whom are the poets Keats and Shelley, Wyatt the sculptor, and Bell the anatomist.

CE'STOID WORMS (Lat. *cestus*, a band or throng), a family of *Entozoa*, or in-

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testinal worms, of the order *Cœlelmintha* (q. v), consisting of tape-worms and other creatures which resemble them in structure and habits. The number of different kinds of C. W. is great. Their natural history is important in reference to the health of human beings and of the most valuable domesticated animals; and although the subject is not in all respects an agreeable one, it presents much that is interesting and wonderful. Recent discoveries have given it an entirely new character.

C. W., in their most perfect state, when alone they possess the form from which their name is derived, are in reality compound animals, like many zoophytes and ascidians. They do not, however, like these, subsist by food entering the system through mouths with which the individuals composing it are furnished; for the joints of a cestoid worm, the individuals composing the system or "colony," have no mouths; nor is there any mouth in what is, on various accounts, quite properly regarded as the head, but nutriment is obtained from the surrounding medium by *endosmose* (q. v.); nourishing juices entering everywhere through the skin, as in the spongioles of the roots of plants, into the cellular tissue or *parenchyma* of which the whole body consists. The head of a cestoid worm is furnished with organs—different in different kinds—by which it affixes itself to the inner surface of the intestine of a vertebrate animal. When first it gets into this situation, the body is very short, and has no joints; but they soon begin to appear as transverse strize, and gradually increasing in size, become in most of the kinds very distinct, and at last separate from the system in which they were produced, and are carried away out of the intestines of the animal which contained them. This does not take place, however, till they have not only become mature in the development of the sexual organs—the principal organs to be observed in them—but until they are full of what are called eggs, which, indeed, are rather young ones ready for a separate existence, and each enveloped in a sort of protective shell. Each joint of a cestoid worm is androgynous. Whilst the most matured joints are thrown off from the posterior end, new joints are continually formed, as at first, in the part nearest to the head. The number of joints thus formed from a single individual is very great, as will appear when it is considered that tape-worms have been found 20 feet long or upwards, and that these have probably been throwing off joints in large numbers before opportunity has been obtained of measuring them.

As the C. W. have no mouth, so they have no alimentary canal. Some of them, as the true tape-worms, have been supposed to imbibe nourishment by the sucking disks of the head; but these are more probably mere organs of attachment, and the canals which are seen to arise behind them, apparently belong, not to the digestive, but to the vascular system, and are united by transverse vessels or vascular rings in the head and in each of the segments. The only trace of a nervous system hitherto observed is a single ganglion in the head, which in some is seen to send off nerves to the suckers.

The division into segments remains imperfect in some cestoid worms. Those of the genus *Ligula*—chiefly found in birds and fishes—resemble a long flat ribbon, not even notched along the edge, and containing a mere series of hermaphrodite brood-places. When segmentation is perfect, the segments (*proglottides*), on separating from the parent system (*strobila*), possess life and a little power of independent motion, creeping away on moist ground, plants, &c. Their period of separate existence, however, is brief; they burst or decay, and the numerous minute embryos which they contain are ready to commence their career, if in any way transferred into the stomach of an animal of proper kind, which is generally different from that whose intestine their parent inhabited. This may happen by their being swallowed—or even the *proglottis* itself—along with water, grass, &c. Some of the C. W. in this embryo state find their appropriate place in the stomachs of vertebrate, and others in those of invertebrate animals.

The shell being broken or digested, the young cestoid worm is set free. It is extremely unlike the proglottis by which it was generated. It presents the appearance of a vesicle furnished with a few microscopic hooks. It possesses, however, a power of active migration by means of these hooks, and is able to perforate the stomach of the animal which contains it. To this its instinct seems immediately to prompt it, and it is so minute that it passes through the stomach without any

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serious inconvenience to the animal. It now probably gets into the blood, and is lodged in some of the capillaries, from which it makes its way again by perforation, until it finds a suitable place in some of the tissues or of the serous cavities, in the flesh, or in such organs as the liver or the brain; and here relinquishing all active migration, it rapidly increases in size, at the same time developing a head, which is in fact that of a cestoid worm, and generally either encysts itself or is encysted—enclosed in a cyst (q. v.)—according to circumstances, or according to its species. Great numbers of such parasites are sometimes present in a single animal, causing disease and even death. Until recently, they were regarded by naturalists as constituting species and genera quite distinct from the C. W., of which they are really the young; and the name *scolex*, formerly given to one of these supposed genera, has now become a common name for the young of all C. W. in this stage, as *larva* is the common name for the young of insects in their first stage after being hatched from the egg. Those scolices which inhabit vertebrate animals very generally become distended with a watery fluid, and in this state were formerly regarded as Hydatids (q. v); little else, indeed, appearing without very careful examination, but a small bag filled with fluid, the scolex head being formed within the bag, although capable of being everted from it, as the finger of a glove which has been drawn in at the end is turned out. Such is the young of the common tape-worm (*Tænia solium*), formerly known to naturalists as *Cysticercus cellulosæ*, and found in the flesh of the pig and of some other animals, and sometimes of man. It is this scolex, existing in great numbers, which produces in the pig the diseased state commonly known as *measly*; and it is very unsafe even to handle measly pork in a raw state, because a scolex accidentally getting into the mouth, and thence into the stomach, is likely to become a formidable inmate of the intestinal canal. It does not appear that this particular species has the power of multiplying in its scolex state, or the circumstances in which it exists in the flesh of the pig may be unfavorable to its so doing, and the prodigious numbers sometimes existing in a single animal have probably all entered by the mouth in the way already described, the contents of a single proglottis or joint of a tape-worm being perhaps sufficient to account for them; but some scolices, as that called *Cœnurus cerebralis*, found in the brain of sheep, and the cause of the disease called *staggers*—now known to be the scolex of a *Tænia* of the dog—are proliferous by a sort of pullulation, so that clusters of scolices cover the same parental vesicle. Until, however, the scolex reaches the intestine of an animal suited to it, its propagation is entirely unsexual, and no organs of sex exist; but no sooner is it there, than it begins to develop itself into a cestoid worm, and to produce androgynous joints, fertile of new embryos, as already described. Thus we have in these creatures an instance, in its relations the most important known, of the recently discovered alternation of generations. See GENERATIONS, ALTERNATION OF. The transference of the scolex from its place of growth to that in which it becomes a cestoid worm, usually, if not always, takes place by the animal which contains it being eaten by that whose intestine is suitable to its perfect development. Each kind of cestoid worm is limited to certain kinds of vertebrate animals, and it has been proved by experiment that if introduced into the stomach of other kinds, the scolices soon die. The only C. W. which infest the human species are *Bothriocephalus* (q. v.) *latus*, and Tape-worms (q. v.). See Von Siebold's interesting work on Tape and Cystic worms, printed for the Sydenham Society (London, 1857).

CESTRA'CION, a genus of sharks, regarded as constituting a distinct family, *Cestraciontidæ*, although not more than two species are known as now existing. It is characterised by having two dorsal fins and one anal, the first dorsal situated over the space between the pectorals and ventrals; a spine forming the front of each dorsal; a short wide tail, with its upper lobe strongly notched beneath; the mouth at the fore-end of the snout; spout-holes distinctly visible, rather behind the eyes; eyes destitute of nictitating membrane; small gill-openings; and the front of the mouth armed with sharp angular teeth, whilst the margins and inner surface of the jaws are covered with pavement-like teeth, presenting a general continuity of surface, as in skates, and disposed in rounded oblique scrolls—the former evidently adapted to the seizing of food, the latter to the crushing and bruising of it. The Port-Jackson Shark or "Nurse" (*C. Philippi*) of the Australian seas, and the Cat Shark of Japan and China (*C. Zebra*), seem to differ chiefly in the patterns of color.

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The *Cestracionti*dæ are particularly interesting to geologists; for the oldest fossil sharks belong in great part to this family, of which "remains are found even in the Palæozoic strata; they become more numerous in the Carboniferous series; they are very numerous in the Lias and Chalk formations; but there they cease almost entirely, the strata of the Tertiary series scarcely containing any of them;" whilst now the species are reduced, as we have seen, to one or two, and other types of shark have become more prevalent.

CE'STRUM, the style or spatula used by the ancients in encaustic painting in wax and ivory. See ENCAUSTIC.

CE'STUI QUE TRUST, a person who possesses the equitable right to deal with property, the legal estate in which is vested in a trustee. There is such a confidence between the cestui que trust and his trustee, that no action at law will lie between them, but they must settle their differences and arrange their disputes in a court of equity. "The phrase cestui que trust is a barbarous Norman law French phrase, and is so ungainly and ill adapted to the English idiom, that it is surprising that the good sense of the English legal profession has not long banished it, and substituted some phrase in the English idiom, furnishing an analogous meaning,"—Wharton's "Law Lexicon," p 130.

CE'STUS (Gr. *kestos*, embroidered), a girdle worn by Greek and Roman women close under the breasts, and so distinguished from the *zone*, worn round the loins. The C. of Venus was covered with alluring representations, so that Juno borrowed it when she desired to win the love of Jupiter.—CESTUS—or, more correctly, CÆSTUS, from the Lat. *cædere*, to slay—is also the name of the covering for the hands worn by Roman pugilists. It was at first nothing more than a leathern thong or bandage to strengthen the fists; but afterwards it was covered with knots and nails, and loaded with lead and iron, &c., to increase the force of the blow. It was not uncommon for a pugilist armed with a C. to dash out the brains or break the limbs of his antagonist. The Roman pugilist (*cæstuarius*) was often represented in sculpture.

CETA'CEA (Gr. *ketos*, a whale), an order of Mammalia (q. v.) greatly differing, in general form and habits from the rest of that class, so as indeed to be popularly reckoned among fishes. The C. have a fish-like form, terminating in a fish-like tail or tail-fin, which, however, is not vertical, as in fishes, but horizontal, and is the great instrument of progression; being moved by very powerful muscles, commonly with an oblique downward and lateral movement, like that by which a boat is propelled in sculling, but sometimes by direct upward and downward strokes, when greater velocity is requisite. There are no hinder limbs, and even the pelvis is represented only by two small rudimentary bones, suspended in the soft parts, so that the body tapers gradually and uninterruptedly towards the tail. The fore-limbs are exclusively, or almost exclusively, adapted for swimming; their bones, however, appearing in the skeleton as those of a hand, placed at the extremity of an arm, of which the bones are much abbreviated and consolidated, with little power of motion except at the shoulder-joint, and are entirely concealed in the soft parts of the animal. The head is connected with the body without any apparent neck, and the vertebræ of the neck are partly ankylosed or soldered together. The skin is naked, having no general covering of hair, although some of the species possess conspicuous whiskers. The C. agree with quadrupeds, notwithstanding the great differences already indicated, in the most important parts of their organisation. They are viviparous, and suckle their young, for which they exhibit great affection; they are also warm-blooded, breathe by lungs, and not by gills, and come to the surface of the water for the purpose of inhaling air. An approach to their fish-like form is to be seen in Seals (q. v.) and other *Phocidæ* (q. v.); in which, however, the hinder limbs are largely, although peculiarly developed, whilst the fish-like tail-fin is wanting; the skin has a covering of hair; and the head and fore-limbs more resemble those of ordinary quadrupeds.

The C. are usually divided into two sections—the *Herbivorous* and the *Ordinary* C.; but the former, constituting the family of *Manatidæ* (q. v.), have recently, by some systematic naturalists, been rejected from this order altogether, and associated with the *Pachydermata*. They differ very widely from the ordinary or true C. not only in their adaptation for the use of vegetables instead of animal food, which appears both in their dentition and in their digestive apparatus, but also in their

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pectoral instead of abdominal teats, and in their want of *blow-holes* and of any provision for retiring to great depths of the ocean, and remaining there for a considerable time, without returning to the surface to breathe.

The ordinary or true C. are divided into the families of *Delphinidæ* (Dolphin, Porpoise, Beluga, Bottlenose, Norwhal, &c.), *Physeteridæ* or *Catodontidæ* (Cachelot, or Spermaceti Whale, &c.), and *Balænidæ* (Greenland Whale, Rorqual, &c.), the distinguishing characters of which are given under separate heads. They all feed on animal food, some of them pursuing and devouring fishes; others, and these the largest, subsisting chiefly on smaller prey, mollusks, small crustaceans, and even zoophytes, which they strain out of the water by a peculiar apparatus in their mouths. None of the true C. have molar teeth or grinders like the *Monatidæ*; all the teeth which any of them have are conical; but some of the largest are entirely destitute of teeth. The females of all of them have the teats situated far back on the abdomen. The fore-limbs of the true C. are mere fins, the slight power of grasping with them which the *Manatidæ* possess, having entirely disappeared. The resemblance to fishes is increased in many of them by the presence of a dorsal fin. There is a wonderful provision to enable them to spend some time under water, before returning again to the surface to breathe—an arterial plexus or prodigious intertwining of branches of arteries, under the pleura and between the ribs, on each side of the spine. This being filled with oxygenated blood, after the animal has spent some time at the surface breathing, the wants of the system are supplied from it, whilst breathing is suspended, so that some whales can remain below even for an hour. The position of the nostrils is remarkable, almost on the very top of the head, so that the animal can breathe as soon as the head comes to the surface of the water; and the nostrils are furnished with a valve of singular but very perfect construction, a sort of conical stopper of fibrous substance, preventing the ingress of water even under the pressure of the greatest depths. The nostrils appear to be little used for the purpose of smelling, the sense of smell being one which these animals either do not possess at all, or in a very imperfect degree; but they are much used, not only for breathing, but also for *spouting*, or the ejection of water from the mouth, for which reason they are generally called *blow-holes*—the water being forced through them by the compression of two large pouches or reservoirs which are situated beneath them. This compression is accomplished by an action similar to that of swallowing; the throat, however, not being open, but closed. The height to which the water is thrown into the air is extraordinary, and the spouting of the whale is one of those wonders of the ocean never to be forgotten by those who have seen it.

A peculiarity in the skin of the true C. adapts them for their manner of life. The skin is extremely thick, the inner part of it consisting of elastic fibres interlacing each other in every direction, the interstices of which are filled with oil, forming the substance usually called *blubber*. The oil deposited in this unusual situation, not only serves the ordinary purposes of fat, but that also of keeping the body warm, which to a warm-blooded animal, continually surrounded with water, is of great importance; whilst the elasticity of this extraordinary skin affords protection in the great depths to which some of the whales descend, and in which the pressure must sometimes amount to a ton on every square inch.

The number of known species of C. is not great, but their natural history has as yet been very imperfectly studied. All of them are large animals, some of them by far the largest that now exist. Almost all of them—both herbivorous and ordinary—are marine, but some of the smaller species ascend large rivers to a great distance from the sea; and one of the family, *Delphinidæ*, belongs exclusively to fresh waters, being found only in the upper tributaries of the Amazon and the elevated lakes of Peru.

Fossil Cetacea have been hitherto discovered only in the Tertiary formation. Their remains represent species not only belonging to each of the recent families of true C., but have supplied materials for forming a new family intermediate between the true whales and the herbivorous cetacea. These fossils were originally described as reptiles; but they have been satisfactorily shewn to be carnivorous C. by Owen, who, from their remarkable conjugate teeth, has given the typical genus the name of *Zeuglodon* (q. v.), and the family that of *Zeuglodontidæ*. In all six or seven species have been described belonging to this family, from the Eocene and

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Miocene beds of Europe and America. The *Delphinidæ* appear first in the Miocene strata, and continue through the newer beds. The remains of a Narwhal, which cannot be distinguished from the living species, have been found in several places in England. Of *Physeteridæ* three species have been noticed in Pleiocene and Pleistocene strata, belonging to the recent genus *Physeter*. Fossil *Balænidæ* occur in the Miocene and newer beds. Only four species have been described, if we exclude *Cetotolites* (q. v.), a name given to teeth and ear-bones, belonging to animals of this family, which occur in great numbers in the Suffolk Crag.

CETOTOLITES, a name given by Owen to fossil cetacean teeth and ear-bones, which occur in great abundance in the Red Crag of Suffolk, a member of the Pleiocene period. They are rubbed and water-worn, and have evidently been washed out of some earlier strata, which remain yet unrecognised. The extent of these earlier strata must have been very great, seeing that the remains now extend over a large district in Essex and Suffolk, and attain a thickness, in some places, of not less than 40 feet. Professor Henslow, in 1843, drew the attention of agricultural chemists to this deposit, as a source of materials for manure, and since then superphosphate manures have been manufactured from it to the value of many thousand pounds annually; a striking example of the valuable practical results which frequently flow from a purely scientific discovery.

CETRA'RO, a town of South Italy, in the province of Cosenza, situated on the Mediterranean, 24 miles north-west of Cosenza. It has anchovy fisheries, and a population of 2619.

CETTE, a seaport town of France, in the department of Hérault, is built on a neck of land between the lagoon of Thau and the Mediterranean, in lat. 43° 24′ n., long. 3° 42′ e. The town, which is entered by a causeway raised above the Thau lagoon, and a bridge of 52 arches, is fortified, and the harbor is defended by a citadel and forts. The space enclosed by the piers and breakwater forming the harbor is about 30 acres, and has a depth of from 16 to 19 feet. A broad deep canal, lined with excellent quays, connects the port with the Lake of Thau, and so with the Canal du Midi and the Rhone, thus giving to C. an extensive inland traffic; it has likewise an active foreign commerce. The principal trade is in wine, brandy, salt, dye-stuffs, perfumery, and verdigris. C. has ship-building yards, and fisheries of oysters and anchovies. Pop. (1872) 24,103.

CETTIGNÉ, or Cetinjé. See MONTENEGRO.

CEU'TA, a town belonging to Spain, situated in the kingdom of Fez, on the north coast of Africa, and opposite to Gibraltar, in lat. 35° 54′ n., and long. 5° 16′ w. It is strongly fortified, and defended by a citadel and forts erected on Mount Hacho, the ancient *Abyla*, or South Pillar of Hercules. It is the most important of the four Spanish *presidios*, or convict establishments, on this coast. The harbor is small and not very safe; and the population, which amounts to 8200, is composed of Spaniards, Moors, Negroes, Mulattoes, and Jews, mostly very poor, and employed in trade and fisheries. Many of the Spaniards living here are state-prisoners, and even the garrison is partly manned by convicts. C., formerly called *Septa* or *Septem*, was taken from the Vandals in 534 by Justinian, who fortified the place anew. In 618, it fell into the hands of the Western Goths; afterwards it was taken by the Moors, who held it until 1415, when it was captured by the Portuguese. It was annexed, with Portugal, to the crown of Spain in 1580, and was the only place on the African coast retained by Spain when Portugal was restored to its independence in 1640.

CEVADI'LLA. See SABADILLA.

CEVENNES (ancient *Cebenna*), the chief mountain-range in the south of France. With its continuations and offsets, it forms the water-shed between the river-systems of the Rhone and the Garonne. Its general direction is from north-east to south-west, commencing at the southern extremity of the Lyonnais mountains, and extending under different local names as far as the Canal du Midi, which divides it from the northern slopes of the Pyrenees. The central mass of the C. lies in the departments Lozère and Ardèche, Mont Lozère reaching an elevation of 4884 feet, and Mont Mézen (the culminating point of the chain) an elevation of 5794 feet. The average height is from 3000 to 4000 feet. Their masses consist chiefly of

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amphibolic rocks, grauwacke, and limestone, covered with tertiary formations, which in many places are interrupted by volcanic rocks.

The C. has been celebrated as the arena of religious warfare. As early as the 12th c., the several sects known by the names, the "Poor of Lyon," the *Albigenses* (q. v.), and the *Waldenses* (q. v.), were known and persecuted in this district. After the revocation of the Edict of Nantes by Louis XIV. in 1685, a series of cruel persecutions of the Protestants in the C. began, especially in 1697, after the Peace of Ryswick. "Dragonnades" (q. v.) were employed to enforce the doctrines of the monks sent as missionaries into the heretical district. All persons suspected of Protestantism met with the most harsh and cruel treatment. Some of the inhabitants emigrated, others fled into the fastnesses of the mountains. Driven to desperation, the persecuted people at length rose to arms, and the murder of the Abbé du Chaila, who was at the head of the dragonnades, gave the signal of a general insurrection in 1703. The insurgent peasants were styled *Camisards*—possibly from *camise*, a smock worn by the peasantry. Headed by bold leaders, the most famous of whom were Cavalier and Roland, they defeated the troops sent against them by Louis again and again, until that king thought the insurrection of sufficient importance to require the presence of the distinguished general, Marshal Villars; but he was recalled before the revolt had been put down, and it was left to the Duke of Berwick to extinguish it in blood; the contest terminating in an entire desolation of the province, and the destruction or banishment of a great portion of the inhabitants. The embers of religious hatred still remained glimmering through the following century, and, after the restoration of the Bourbons in 1815, burst out into flames in the terrible persecution of the Protestants in Nîmes (q. v.) and other places in the south of France. See "Histoire des Troubles des Cevennes, ou de la Guerre des Camisards" (Villefranche, 1760), and Schulz's "Geschichte dex Camisarden" (Weimar, 1790).

CEYLANITE. See SPINEL.

CEYLO'N (the *Taprobane* of the Greeks and Romans, and the *Serendib* of the "Arabian Nights,") a valuable island and British colony in the Indian Ocean, to the south-east of the peninsula of Hindustan, from which it is separated by the Gulf of Manaar and Palk's Strait. Recent observations have shewn its true place to be between 5° 55′ and 9° 51′ n. lat., and 79° 42′ and 81° 55′ e. long. Extreme length from north to south, from Point Palmyra to Dondera Head, 271¼ miles; greatest width, from Colombo to Sangemankande, 137¼ miles. Area, including dependent islands, 24,454 square miles.

Physical Features.—In natural scenery, C. can vie with any part of the world; and as it rises from the ocean, clothed with the rich luxuriance of a tropical vegetation, it seems to the voyager like some enchanted island of Eastern story. Its hills, "draped with forests of perennial green," tower grandly from height to height, till they are lost in clouds and mist. Near at hand, a sea of sapphire blue dashes against the battlemented rocks that occur at isolated points, and the yellow strands are shaded by groves of noble palms. In shape, C. resembles a pear, but its inhabitants more poetically compare it to one of their elongated pearls. Undulating plains cover about four parts of the island, and the fifth is occupied by the mountain-zone of the central south, which has an elevation of from 6000 to 8000 feet above the sea-level. Pedrotallagalla, the highest mountain in the range, attains the height of 8280 feet; the celebrated mountain of Adam's Peak, 7420 feet; and the table-land of Neuera Ellia, 6210 feet.

Geology.—The mountain system is mainly composed of metamorphic rocks, chiefly gneiss, frequently broken up by intruded granite. With the exception of some local beds of dolomitic limestone, the gneiss is everywhere the surface rock, and the soil is composed of its disintegrated materials. No fossils, as was to be expected, have been noticed in C., if we except the semi-fossil remains of mollusca, crustacea, and corals, belonging to living species, which occur in the rude breccias of the north in the neighborhood of the sea. The northern part of the island is rising, and there also the land is making encroachments on the sea from another agency. The immense masses of corals continually increasing, retain the débris brought from the Indian continent by the currents of the sea, and thus form a flat, ever-increasing madrepore plain.

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Of *metals and minerals*, iron, in the form of a carbonate, can be obtained in great quantities, and of such purity as to resemble silver. Tin is found in the alluvium at the base of the mountains, and on the heights the rare metal tellurium has been discovered. Nickel and cobalt are scarce. Anthracite and rich veins of plumbago exist on the southern range of hills. The *gems* of C. have been celebrated from time immemorial, and they are most plentiful in the alluvial plains at the foot of the hills of Saffragam. Sapphires, rubies, the oriental topaz, garnets, amethysts, cinnamon stone, and cat's-eye, are the principal gems and precious stones of the island. The most valuable is the sapphire; and one of these, found in the year 1853, was worth more than £4000. The value of the precious stones annually found in the island is estimated at £10,000. The pearl fisheries of C. have long been famous, and since the beginning of the century are conducted directly for behoof of the government. But sometimes fishing operations have to be suspended for a considerable period; thus there was no fishery from 1863, when the value obtained was £46,000, till 1874, when pearls worth £9300 were secured.

Rivers—The most important river in C. is the Mahawelli-ganga. It has its source in the vicinity of Adam's Peak, and after draining more than 4000 square miles, it separates into several branches, and enters the ocean near Trincomalee. The south side of the island is watered by ten rivers of considerable size, which flow into the sea between Point de Galle and Manaar. On the east coast, the rivers are smaller, but still more numerous, and many others traverse the northern and eastern provinces.

Harbors.—Point de Galle (q. v.) and Trincomalee (q. v.) are the two harbors of Ceylon. The former is small and dangerous, but the latter is unsurpassed as a safe and commodious port. The variation of the tides is very trifling; the rise and fall not generally exceeding 18 to 24 inches, with a third of increase at spring-tides.

In *climate*, C. has a great advantage over the mainland of India, and as an island, enjoys a more equable temperature. The average for the year in Colombo (q. v.) is 80° in ordinary seasons. April is the hottest month; and in May the south-west monsoon commences amid a deluge of rain, and continues the prevailing wind till October, when the north-east monsoon sets in: 80 inches is the average annual fall of rain, though in an exceptional year, 120 inches have been registered. The beautiful table-land of Neuera Ellia was first visited by Europeans in 1826, and is now used as a sanatorium. Here the thermometer in the shade never rises above 70°, while the average is 62°; the nights are cool and refreshing. The north of the island, including the peninsula of Jaffna, the plains of Neuera Kalawa, and the Wanny, may be reckoned as a third climatic division. Here the annual fall of rain does not exceed 30 inches, and irrigation is largely employed in agriculture.

Flora.—The general botanical features of C., especially of the lowlands, are nearly identical with those of Southern India and the Deccan, although it possesses a few genera of plants not to be found in those regions. Its phænogamic plants are limited to about 3000. The beautiful ixoris, erythrinas, buteas, Jonesias, and other flowering shrubs bloom in the forests. At an elevation of 6500 feet, the acanthaceæ cover large tracts of ground, and the tree-fern reaches the height of 90 feet. On the highest ground, rhododendrons attain to the size of timber-trees. The Coral-tree (*Eurythrina Indica*), the Murutu (*Lagerstræmia Reginæ*), and the *Jonesia asoca* are amongst the most magnificent of the flowering trees. The fig tribe are planted in the vicinity of the temples. In the forests, climbing-plants and epiphytes of prodigious size and striking appearance cover the trees with a mass of parasitical foliage of extraordinary growth. The Palmaceæ are very conspicuous in the vegetation of C., although not more than 10 or 12 species are indigenous; the cocoa-palm—of which it is estimated there are not less than 20 millions of trees—the talipot, the palmyra—which forms extensive forests in the north of the island—and the jaggery palm, are the most noteworthy. Of timber-trees, 416 varieties are known, and amongst these the satin-wood holds the first rank. The flora of the highlands, above 2000 feet, and up to 6000 to 7000, though much resembling that of the Neilgherries, has a marked affinity to the vegetation of the highlands of Malacca and Java, especially the latter.

Fauna.—A knowledge of the fauna of C. has been greatly advanced by the labors of Drs Templeton and Kelaart, and Mr Edgar Layard. *Quadrumanous* animals are represented by the *Loris gracilis*, and five species of monkeys. Sixteen species of the *Cheiroptera* or bat tribe, exist in C.; and what is very remarkable, many of these rival the birds in the brilliancy of their colors. The *Pteropus Edwardsii* (the flying-

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fox of Europeans) measures from 4 to 5 feet from tip to tip of its extended wings. Of the larger *Carnivora*, the bear and leopard; and of the smaller, the palm-cat, and the glossy genette (the civet of Europeans) may be mentioned. The dreaded tiger of India, the cheeta, the wolf, and the hyæna, are happily not met with in Ceylon. Deer, buffaloes, and the humped ox of India are amongst the *Ruminantia;* the little musk-deer (*Moschus meminna*) is less than two feet in length. The *Pachydermata* are represented by the elephant and the wild boar: the former, which is for the most part tuskless, is emphatically lord of the forests of Ceylon. The most remarkable of the *Cetacea* is the dugong. Whales are captured off the coast. 320 species of *Birds* have been ascertained by Drs Templeton and Kelaart and Mr Layard. The song of the robin and long-tailed thrush, and the flute-like voice of the oriole, are heard over the whole mountain zone, and far down into the neighboring plains. Eagles, the beautiful peregrine falcon, owls, swallows, kingfishers, sunbirds, bulbuls, crows, parroquets, pigeons, pea-fowl, jungle-fowl, and many others of the feathered tribe might be mentioned did space permit. Myriads of aquatic birds and waders, amongst which the flamingo is conspicuous, cover the lakes and lagoons. The crocodile is the largest reptile in the island; tortoises and lizards are also found. There are a few species of venomous snakes, and of these the ticpolonga and the cobra da capello are the most deadly.

Inhabitants.—The Singhalese, the most numerous of the natives of C., are the descendants of those colonists from the valley of the Ganges who first settled in the island 543 B.C. In their customs, costume, and general appearance, they have remained unchanged since the days of Ptolemy. The dress of the men, who have delicate features and slender limbs, is singularly effeminate, and consists of a *comboy* or waist-cloth, very much resembling a petticoat; their long hair, turned back from the forehead, is confined with combs and earrings are worn by way of ornament. The women, in addition to the comboy, cover the upper part of the figure with a white muslin jacket, and adorn themselves with necklaces, bangles, rings, and jewellery. The Singhalese are false and cowardly, but manifest a strong affection for their relatives, and a reverence for old age. Polyandry still lingers in the interior of C., and was formerly universal; it is now, however, chiefly confined to the wealthier classes, amongst whom one woman has often three or four husbands. The Kandyans, or Highlanders, are a more sturdy race, and maintained their independence for three centuries after the conquests of the low country by European settlers. The Malabars, or Tamils, have sprung from those early invaders of C., who from time to time swept across from Southern Hindustan, and contended with the Singhalese kings, for the sovereignty of the island. They have formed the chief population of Jaffna for full 2000 years, and constitutionally excel the Singhalese and Kandyans. The Moormen, who are the most energetic and intelligent of the native communities, are met with in every province as enterprising traders. They are a very distinct race from the Singhalese, but have no tradition of their origin. Europeans generally believe them to be of Arab descent, but Tennent is of the opinion that "they may be a remnant of the Persians, by whom the island was frequented in the fourth and fifth centuries."

The "burghers" of C. are a people of European descent, who have become naturalised. Those of Portuguese extraction hold the lowest place, and are mostly tradesmen and artisans; but the Dutch burghers frequently fill responsible posts, and are employed in the government offices.

Besides the races already alluded to, there is a remarkable tribe of outcasts—the Veddahs—hardly removed from the wild animals of the forest, and believed to be descended from the Yakkhos, the aboriginal inhabitants of the country. They occupy a district in the eastern part of the island, and have there preserved their ancient customs and manner of living unaltered for more than 2000 years. They appear to be without the instinct of worship, and have no knowledge of a God. The tribe is divided into the *Rock Veddahs* and the *Village Veddahs*. The former hide themselves in the jungle, live by the chase, and sleep in trees or caves. They use fire to cook their meat, and their greatest gastronomic treats are the iguana lizard and roasted monkey. Their language—if the few words they make use of can be called by that name—is a dialect of the Singhalese. The Village Veddahs locate themselves in the vicinity of the European settlements, on the eastern coast, living in rude huts of mud and bark, and are hardly more civilised than their brethren of

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the jungles. The exertions of government to reclaim this harmless but degraded people have in some degree succeeded, and a promising colony has been formed.

Population.—Sir J. E. Tennent is of opinion that C., when in the height of its prosperity, must have been ten times as densely peopled as at the present day. In the official returns for the year 1870, the area and population of the six provinces of Ceylon are given as follows (total pop. in 1871, 2,405,287):

Provinces.	Area in Sq. Miles.	Total Population.	Pop. per Sq. Mile.
Western	3,345	662,658	198·11
North-western	2,805	214,699	76·54
Southern	1,927	353,989	183·69
Eastern	4,545	96,601	21·25
Northern	6,062	426,597	70·36
Central	5,770	371,466	64·37
Total	24,454	2,126,037	86·94
Military	....	2,847	·11
Total (includ. military)	....	2,128,884*	87·05

Religion.—The Singhalese are devoted to Buddhism (q. v.), which is the prevailing religion of the island. It does not exist, however, in that state of purity in which it is still found in the Indo-Chinese peninsula. Its sacred books are identical with those of Burmah and Siam, and both record the doctrines of Gautama in the Pali language; the deviations are in matters of practice. The Malabar kings adulterated Buddhism to a considerable extent with Brahmanism, introducing the worship of Hindu deities into the Buddhist temples, and this continues more or less to be the case. More than once have the Buddhists of C. sought to restore the purity of their faith—at one time sending deputies to Siam, at another to Burmah, with this object in view. The Burman or Amarapura sect have long been the reformers of Singhalese Buddhism, and maintain no very friendly relations with the party, who, supported by the priests of Siam, acknowledge the civil power in matters of religion, sanction the worship of Hindu deities and the employment of the priesthood in secular occupations, uphold caste, and restrict the sacred books. Caste was acknowledged by the Singhalese prior to the introduction of Buddhism, which in principle is opposed to it; but so firmly was it rooted, that it still endures, though more as a social than a sacred institution. Gautama Buddha is said to have visited C. three different times to preach his doctrine, and his *Sri-pada*, or sacred footstep, on the summit of Adam's Peak (q. v.), still commands the homage of the faithful. Buddhism was not, however, permanently introduced into C. till 307 B.C., when Mahindo, obtaining the support of the king, established it as the national faith. The influence of the priests gradually increased, and, by the piety of the Singhalese kings, monasteries were richly endowed; for though the Buddhist monk is individually forbidden to possess goods, a community may own property to any extent; and it is a remarkable fact that, at the present day, no less than one-third of the cultivated land of the island is computed to belong to the priesthood, and is exempt from taxation. The priests of C. are divided into two orders—the *Samanaros*, and those who, after a time of probation, receive the higher grade of *Upasampada*. The fraternity are not raised by education above their countrymen, and the respect paid them is directed more to the dress than to the person of the individual. Any member is at liberty to lay aside his ascetic character, and return to a secular life. The most celebrated Buddhistic relic in C. is the *Dalada*, or sacred tooth of Gautama, at Kandy, which is guarded with jealous care, and preserved in an elegant shrine; but it is well known that the original relic was destroyed by the Portuguese, and the present substitute is a piece of discolored ivory, bearing no re-

* Including 4732 British and 14,201 whites of European descent.

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semblance to a human tooth. In all Buddhist countries, the sacred buildings present, with certain modifications, the same general character (see articles BUDDHISM, BURMAH, &c.); and in C. we find the three classes represented by the dagoba, or relic-shrine (*datu*, a relic, and *gabbhas*, a shrine), the temple proper, and the vihara or monastery. The labor bestowed on those edifices in the early ages of the Singhalese monarchy is truly astonishing. In the north of the island, ruined cities—buried for ages in the depths of the forest, have been discovered, revealing monuments that in dimensions may almost compare with the pyramids of Egypt. The most remarkable of these vestiges of an early civilisation is Pollanarrua, the ancient capital of C.; and here is the celebrated *Galwihara*, a rock-hewn temple, supposed to be "the only example in Ceylon of an attempt to fashion an architectural design out of the rock, after the manner of the cave temples of Ajunta and Ellora." The reclining figure of Goutama on the right, is 45 feet in length; the upright one measures 23 feet; and the sitting image on the left is 16 feet from the altar to the top of the head. The cave temple of Dambool was built 100 B.C., and is the most celebrated in the island. The bell-shaped tapering dagobas of C., as relic-shrines, answer to the pagodas of Burmah—which they very much resemble—and the topes of Afghanistan. The ruins of the Jaytawanarama dagoba still reach the height of 249 feet; its diameter is 360 feet; and from base to pinnacle it is covered with trees of the largest size. This enormous structure contains 20 millions of cubical feet; and Sir J. E. Tennent concludes that to erect such a mass of masonry, even in the present day, "would occupy 500 bricklayers from six to seven years" at the cost of a million sterling. The Ambustella of Mihintala is another remarkable dagoba. A very famous object in connection with Buddhism in C. is the sacred Bo-tree of Anarajapoora (*Peepul, Ficus religiosa*), which was planted there 288 years B.C., and is by far the oldest tree in the world, of which an authentic history exists. See BO-TREE. Amongst the antiquities of C. must be mentioned those wonderful monuments of the former greatness of the Singhalese people—the ruined tanks; with which almost nothing of a similar kind, whether ancient or modern, can be compared: 30 colossal reservoirs, and about 700 smaller tanks, still exist, though for the most part in ruins. The restoration of these magnificent works of irrigation has recently been begun. Brahmanism or Hinduism (q. v.) is the faith of the Tamils or Malabars, but the Moormen are Mohammedans. After the expulsion of the Dutch Christians, Protestant missions to the natives of C. were commenced by the Baptists in 1813. The Wesleyan Methodists followed in 1814, the Americans in 1816, the Church of England in 1818, and Christian instruction has made some progress amongst the native populations. Of these the peasantry of the Kandyan hills have proved the least accessible to its influence. Schools, collegiate institutions, and female seminaries, under the direction of the missionaries, are in successful operation.

Government.—The administration of C. is vested in a governor, who is assisted by an executive council of five members, and a legislative council of fifteen members. The governor's salary is £7000 per annum. In 1876 the revenue was £1,375,888, and the expenditure £1,276,930. The chief items of revenue are the customs, averaging £286,000; licenses, £150,000; sales and rents of public lands, £230,000. The colony made very great progress under the able administration of Sir H. Ward. The civil and judicial establishments of the colony cost nearly £300,000.

The following are the trade returns for the five years 1870 to 1874:

Years.	Imports.	Exports.
1870	£4,634,397	£3,808,730
1871	4,797,592	3,634,853
1872	5,169,524	3,139,060
1873	5,574,858	5,489,591
1874	5,691,860	4,687,388

Years.	Exports from Ceylon to the United Kingdom.	Imports of British Home Produce into Ceylon.
1870	£3,450,974	£908,415
1871	3,167,673	928,807
1872	3,163,153	1,017,753
1873	4,331,006	1,052,072
1874	3,600,492	1,158,288

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The value of the staple coffee exported from Ceylon to the United Kingdom was, in 1867, £2,814,060; in 1869, £2,867,724; in 1871, £2,623,263; in 1872, £2,341,101; in 1873, £3,692,333; and in 1876, £2,550,688. In 1876, cocoa-nut oil valued at £236,856, and cinnamon at £119,700, were exported to the United Kingdom. To the ancient world, C. was famous as a place of traffic. Egyptians, Greeks, Romans, Persians, and Arabians traded to its ports; and many particulars, such as geographical position and natural productions, seem to identify Point de Galle with the Tarshish of the Hebrew historians.

The *history* of C., of which the limits of this article will only allow the briefest possible outline, may be conveniently divided into ancient and modern, and the latter into the Portuguese, Dutch, and British periods.

The records of its early history came to light in 1826, and Mr Turnour, devoting himself to their study, composed an "Epitome of the History of C.," from the year 543 B. C. to 1798 A. D.; and he records the reigns of 165 kings, who reigned during this space of 2341 years. The most famous of the Singhalese books is the "Mahawanso," a metrical chronicle, in the Pali language, which gives an account of the island during the above 23 centuries. The story begins with the invasion of Wijayo (543 B.C.), son of a petty Indian sovereign in the country watered by the Ganges. He subdued the Yakkhos, the original inhabitants; married a daughter of one of the native chiefs, whom he subsequently repudiated for an Indian princess; and founded a dynasty that held undivided sovereignty in C. for nearly eight centuries. He bestowed on his kingdom his patrimonial name of Sihala (whence Singhalese, Ceylon), and promoted the settlement of colonists from the mainland. In the reign of king Devenipiatissa (307 B.C.), Buddhism was established as the national religion, and his reign was further remarkable by the planting of the sacred Bo-tree, 288 years B.C; and now commenced the erection of those stupendous buildings already noticed. The next important epoch in Singhalese history is the usurpation of the Malabars (237 B.C.), foreign mercenaries from the Coromandel coast, to whom the native sovereigns had intrusted the defence of the island. Several Malabar invasions are chronicled in the history of C., and these foreigners long contended with the native princes for supreme authority. Passing on to 1071 A.D, a native dynasty was then re-established in the person of Wijayo Bahu, which, for 100 years, delivered the country from the dominion of the Malabars. Prakrama Bahu commenced a reign, in 1153, the most renowned in the records of Ceylon. He devoted himself to religion and agriculture, and besides many notable religious edifices, he caused no less than 1470 tanks to be constructed, subsequently known as the "seas of Prakrama." Thirty years after the death of this monarch, the Malabars landed with a large army, and speedily conquered the whole island. In 1235, a native dynasty recovered a part of the kingdom. During the reign of Dharma Prakrama IX. the Portuguese first visited C., 1505; but it was in 1517 that they first formed a permanent settlement at Colombo for trading purposes. Their encroachments soon raised the patriotic Kandyans, and it is a remarkable fact, that though at the first visit of the Portuguese in 1505 they were even ignorant of the use of gunpowder, they, after a while, excelled their enemies as musketeers, and were finally able to bring 20,000 stand of arms to bear against them. "Amity, commerce, and religion," was the Portuguese motto; but their rule in C. is a sad story of rapacity, bigotry, and cruelty. They were at last driven from the island by the Dutch in 1658, after a contest of twenty years, when, as Sir J. E. Tennent remarks, "the frantical zeal of the Roman Catholic sovereign for the propagation of the faith, was replaced by the earnest toil of the Dutch traders to intrench their trading monopolies; and the almost chivalrous energy with which the soldiers of Portugal resisted the attacks of the native princes, was exchanged for the subdued humbleness with which the merchants of Holland endured the insult and outrages perpetrated by the tyrants of Kandy upon the envoys and officers." But the purely military tenure of the Dutch was destined to give place to the colonisation of the British. It was during the great European war succeeding the French Revolution, that the English gained possession of the island. On the 1st August 1795, an expedition under Colonel James Stuart landed at Trincomalee, which was speedily captured, and finally the garrison at Colombo surrendered on the 16th February 1796. By this capitulation, all the Dutch settlements and strongholds in C. were ceded to the English; though the island was not formally annexed to the British crown till the Peace of Amiens, 27th March 1802.

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The native sovereigns, however, continued in possession of their mountain territory; but at length the Kandyan king, Wikrama Raja Singha, after perpetrating the most frightful atrocities on his own people, seized and murdered certain native merchants, British subjects, trading to Kandy. War followed, January 1815; Kandy was taken, and the tyrant sent a captive to the fortress of Vellore. On the 2d March 1815, a treaty was concluded with the native chiefs, by which the king was formally deposed, and his territories annexed to the British crown.

Since then the island has made rapid stride in material prosperity. The mountain forests have been replaced by plantations of coffee, of which there are now about 500 under cultivation, of 150,000 acres, giving an average crop of 950,000 cwts. per annum. Many important public works have been completed, and others are still in progress. Several good roads have been constructed, including a magnificent mountain road between Colombo and Kandy, and there is a railway 92 miles in length. In 1874 there were 243 government schools, with 11,719 pupils; 882 mission schools, with 44,449 pupils; and 329 private schools, with 9929 pupils.

See "Ceylon, Physical, Historical and Topographical, &c.," by Sir James Emerson Tennent (Lond. 1859); "Christianity in Ceylon," by the same author (Lond. 1850); "The Statesman's Year-book," for the current year; and "Ceylon, a General Description of the Island," by an officer late of the Ceylon Rifles (1876).

CEYX. See KINGFISHER.

CEZI'MBRA, a coast town of Portugal, in the province of Estremadura, about 18 miles south of Lisbon. C. has active fisheries, and a pop. of 5000.

CHABLIS, a village in France, dep. of Yonne, which gives name to a much esteemed white Burgundy (q. v.), wine.

CHA'CMA. See BABOON.

CHA'DDA. See BENUWE.

CHADWICK, Edwin, C. B., a distinguished social and sanitary reformer of the present day, born in the vicinity of Manchester, 24th January, 1801. He studied law, but early devoting his attention to questions of social, sanitary, and political science, he attracted the notice of Lord Grey's government, by whom he was appointed an assistant-commissioner to inquire into the operation of the poor-laws in England and Wales. His report, published with others in 1833, commanded most attention, being remarkable alike for the wide and searching character of its investigations, the happiness of its illustrations, and the convincing proofs it furnished as to the necessity of reform in the system of administration. Its merit was recognized by those who had the power to reward him; and on the organization of the new Poor-law Board, C. was appointed secretary. In connection with this Board, and the General Board of Health, C. for twenty years was energetic in the origination and administration of remedial measures relative to the distribution of poor-law funds and to the sanitary condition of the country. He has also given much attention to the constitution of the constabulary force with a view to the better prevention of offenses and the readier detection of criminals. On a change being made in the Board of Health in 1854, C. retired with a pension. He has since taken great interest in promoting competitive examinations for government offices, and indeed in almost all questions of social economy. He has been an active member of the Association for the Promotion of Social Science. In 1859—1860, he collected evidence for the Education Commission.

CHÆRONEI'A, a city of Bœotia, in ancient Greece, near the Cephissus, on the borders of Phocis. It is celebrated on account of several important battles fought in the neighborhood. In 447 B.C., the Bœotians here obtained a victory over the Athenians; and in 338 B.C., Philip of Macedon signally defeated the united forces of the Athenians and Bœotians, and so crushed the liberties of Greece. A mound of earth, about a mile from the modern village of Kapurna, which occupies the site of the old city, still marks the place where the Thebans who fell in the battle were buried; and a magnificent lion, which Colonel Mure pronounced to be "the most interesting sepulchral monument in Greece," was excavated from this tumulus some years ago. At C., also, 86 B.C., Sulla defeated the generals of Mithridates. Plutarch was a native of this town. A few ancient remains yet exist.

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CHÆTODO'NTIDÆ, a family of acanthopterous fishes, nearly corresponding to the genus Chætodon (Gr. hair-tooth) of Linnæus; and also named SQUAMIPENNES (Lat. scaly-finned), because of the most distinctive character of the family, the incrustation of the soft portions of the dorsal and anal fins, and often of the spinous parts also, with scales, the fins appearing to taper gradually out of the thickness of the body, which is in general remarkably compressed, so that, without dissection, it is impossible to tell where they begin. The scales are strongly ctenoid (q. v.). The typical genus *Chætodon* and those most nearly allied to it, have hair-like teeth, so that their jaws resemble brushes; some fishes of the family, however, have trenchant teeth on the jaws, and some, as *Brama* (q. v.), have card-like teeth both on the jaws and palate. Most of the C. are tropical; only one species, *Brama Rati*, is ever found in the British seas. They generally frequent rocky shores. Their colors are often extremely gay, and usually disposed rather in stripes or bands than in spots. "The eye of man receives the greater pleasure from their contemplation, in that, being of moderate or small size, and haunting habitually the coral basins of the transparent tropical seas, they disport themselves in the beams of a vertical sun, as if desirous of exhibiting their splendid liveries to the greatest advantage in the blaze of day." Many singularities of form occur in this family, as the long slender snout of the *Chelmons*, the whip-thong-like prolongation of some of the rays of the dorsal fins in *Heniochus* and *Zanclus*, the wing-like dorsal and the anal fins of *Platax*, the sharp recurved horns of the Buffalo-fish (*Taurichthys*), &c. To this family belong the Archer-fishes (q. v.), whose singular habits have already been noticed. The flesh of most of the C. is of very fine flavor.

CHA'FER, a common name of those beetles or coleopterous insects, which either in the perfect or larva state, are destructive to plants; particularly those which devour the wood, bark, or roots of trees. From these, however, it is sometimes extended to some coleopterous insects which have no such habit. The word C. is seldom used alone, but generally as part of a name, with some prefix; thus, we have *Cock-chafer*, *Rose-chafer*, *Bark-chafer*, &c.

CHA'FF-CUTTER, a name commonly given to an implement now much used by farmers for cutting hay and straw into half-inch lengths. The advantage of this consists not so much in facilitating mastication or digestion, as in preventing animals from wasting their food. No small amount of mechanical ingenuity has been applied to the construction of chaff-cutters, the simplest and oldest kinds of which are mere hand-machines with a single large knife, the hay or straw being pushed forward in a trough or box, whilst others are driven by horse, steam, or water power, and are not a little complicated.

CHA'FFINCH (*Fringilla cœlebs*,). one of the most common British birds, a species of Finch (q. v.), and probably that to which the name Finch, now so extended in its signification, originally belonged; *fink*, the German form of the name, and *pink* and *twink*. English provincial forms still appropriated to the C., having some resemblance of sound to its common call-note. The whole length of the C. is about six inches. The tail is very slightly forked. The male, in summer, has the top of the head and nape of the neck bluish-gray; the back, chestnut; the wings almost black, with two conspicuous white bars; the tail, nearly black. The colors of the female are much duller than those of the male. The C. is a very widely distributed species, being found in almost all parts of Europe, in some parts of Asia, in the north of Africa, and as far west as the Azores. In the colder northern countries, it is migratory; in more southern regions, it is stationary. Linnæus gave it the specific name *cœlebs*, from observing that the flocks congregated in winter in Sweden consisted chiefly of males, the females having, as he supposed, sought a milder climate. A partial separation of the sexes is observed also in the great winter-flocks in Britain, but it is only partial: and Yarrell thinks that the young males of the previous season, which resemble the females in plumage, are associated with them, and have been mistaken for them. The flocks seen in Britain in winter are believed to be augmented by migration from Scandinavia. The eggs are usually four or five in number, of pale purplish buff color, sparingly streaked and spotted with reddish brown. The C. feeds chiefly on insects, and does much service in summer by destroying aphides and caterpillars:

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but eats also seeds, and is sometimes persecuted, because in spring it pulls up and eats young turnips and radishes when in the seed-leaf. Great numbers of chaffinches are killed for the table in Italy. In Germany, this bird is in the highest esteem as a song-bird. Its notes are very clear and loud, but some individuals greatly excel the ordinary multitude of their species; and their superior notes, if heard on the Thuringian hills, speedily attract bird-catchers. Bechstein says that, in Thuringia, a cow has been given for a C. with a fine voice; and the Germans have taken the trouble to classify the different strains of chaffinches, giving them distinct names, and regarding those birds as particularly valuable by which certain of these strains are produced.—The common Scotch name of the C. is *Shilfa*.

CHAGRES, a river entering the Gulf of Darien on the north side of the Isthmus of Panama, near lat. 9° 18′ n. Though, towards its mouth, it varies in depth from 16 to 30 feet, it is yet, by reason at once of its rapidity and its falls, but little available for navigation. At its entrance is a port of its own name. Both the town, however, and the stream have recently lost nearly all the advantages of their position, through the establishment of an inter-oceanic railway, which, on the Atlantic side, commences at Aspinwall, about 8 miles to the north.

CHAILLU, Paul B. du, a distinguished traveller, was born in the south of France, about 1820. His father was for many years a merchant trading on the Gaboon (q. v.) River, in Western Africa, and thither he was carried when a boy. He lived there for several years, and became familiar with the habits and languages of the natives, thus—as well as in his habituation to the climate—unconsciously preparing himself for the explorations which he was afterwards to undertake. In 1842, the French made a settlement and built a fort on the Gaboon. Under the protection of this fort, both the elder and younger Du C. resided and carried on their commercial pursuits for some years. Du C. afterwards went to America, where he resided for a number of years, and was naturalised by the legislature of the state of New York. In October 1855, he sailed from New York to West Africa, where he spent four years in explorations, making many interesting discoveries and traveling, as he himself tells us, about 8000 miles, always on foot, and unaccompanied by other white men. He returned to America, and after subjecting his specimens in natural history and ethnological notes to the examination of the scientific men of New York and Boston, he crossed the Atlantic to England, and published a volume of travels—"Explorations and Adventures in Equatorial Africa, with Accounts of the Manners and Customs of the People, and of the Chase of the Gorilla, Crocodile, Leopard, Elephant, and other Animals" (Lond. 1861). His travels were in a region lying between n. lat. 1° 30′, and s. lat. 2°, and extending from the coast to about e. long. 14° 15′; and the work in which he gives an account of them contains very important contributions to geographical, ethnological, and zoological science. Under the first of these heads must be ranked, as of chief importance, the information concerning the Fernand Vas, Ogobai, and Rembo rivers, and concerning the mountain chain which, between the equator and s. lat. 1°, stretches from west to east from the neighborhood of the coast far into the interior of Africa. He made known the existence and described the characteristics and habits of a number of African tribes, among which particular interest attached to his account of the Fans (q. v.), a cannibal tribe, inhabiting a region on the western side of the coast-range of mountains, just to the north of the equator. His contributions to zoology related not only to the gorilla and other remarkable apes, some of them previously quite unknown, but included also many new species of mammals and birds. Many of the statements contained in his volume, however, being very extraordinary, it was received with much distrust, and was subjected to very adverse criticism; to which it was the more exposed because the author's journals having been put into the hands of a literary gentleman in America to be prepared for the press, separate journeys were mixed up in the narrative, and the chronology was thrown into confusion. Much discussion took place in newspapers and periodicals, and some writers went so far as to assert their belief that Du C.'s stories about the gorilla were entirely fabulous, and that he had never seen the animal alive, but had purchased the specimens which he brought to England from natives on the coast. His descriptions of nest-building apes were, of course, also received with incredulity, and the truth of his account of the cannibal Fans was much

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doubted. The maps drawn up by Dr Barth and Dr Petermann in 1862 moved the positions of all the places which he had visited much nearer the coast than he had fixed them, so as greatly to reduce the length of his routes. The general trustworthiness of Du C.'s narrative was, however, maintained by some men of the highest eminence, and particularly by Sir Roderick Murchison and Dr Owen. Du C. resolved to confute his opponents, and vindicate his own reputation, by another expedition to Africa, for which he prepared himself by a course of scientific study, to enable him to make astronomical and other observations, and by acquiring the art of photography. During his first explorations, he had laid down the position of places from compass-bearings only. The substantial accuracy of his observations was, however, in the meantime confirmed by a French government expedition under Messrs Serval and Griffon du Bellay, which explored the Ogobai River in 1862; and Dr Petermann then reconstructed his map of that part of Africa as Du C. had originally laid it down. His statements regarding the cannibalism of the Fans were also confirmed by Captain Burton, who himself travelled among them. Du C., however, proceeded on his second expedition. He freighted a small schooner, and sailed in her from England on 6th August 1863, carrying with him not only an ample store of scientific apparatus, but also of goods for presents to the natives, or barter with them. He reached the mouth of the Fernand Vas River on 10th October, and was warmly welcomed by the African chiefs whom he had formerly known; but he sustained a grievous misfortune in the loss of all his scientific instruments and many other valuable articles, through the swamping of the canoe by the surf as they were being landed from the schooner. He was compelled to send to England for another set of instruments, and to wait till they arrived. Meanwhile, he made several excursions in the neighborhood of the coast, through the almost impenetrable jungle which covers the western coast regions of equatorial Africa, and had abundant opportunity of confirming his former observations regarding the gorilla. He also had live ones, caught and brought to him by the natives. In September 1864, Du C., having received his new supply of instruments from England, started on his expedition for the exploration of the interior. He was attended by a body-guard of ten Commi negroes, in thick canvas trousers, blue woollen shirts, and worsted caps, each man having a blanket to keep him warm at night. There was difficulty, however, in getting leave to set out on the expedition at all. It is the universal rule among the coast tribes of West Africa, to prevent, if possible, all strangers from penetrating into the interior, even if it be only to the next tribe, through fear that the exclusive privilege of trading with that tribe should be lost. A grand *palaver* was held on the subject, and it was at last agreed that Du C. should be allowed, as a special favor, to ascend the Fernand Vas or Ogobai, as his object was not to trade, but to shoot animals, and to bring away the skins and bones. "Truly," the chiefs and councillors said, "we do not know what Challie has in his stomach to want such things, but we must let him go." Du C. revisited some of the scenes of his former explorations—the Ogobai, the Rembo, and their branches. He suffered great hardships, being sometimes at a loss even for food, and his attendants being almost all at one time ill of smallpox, which made fearful havoc among the native population, and exposed him to the dangerous suspicion of having caused it by witchcraft. He passed through a forest district so dense that animal life is scarcely found in it, and an almost unbroken silence prevails by day and by night. He found also in his journeyings many scenes of extreme beauty, scenes of mountain and meadow, hill and pasture land, groves of plantains, groves of lime trees remarkable for dark foliage, stately palms, and clear sparkling streams. An unfortunate misunderstanding took place at last between Du C.'s party and the inhabitants of a village which he had reached. A conflict took place, the natives became exasperated, and it was with difficulty that the traveller escaped, being obliged, however, to resign all thought of proceeding further. He reached the mouth of the Fernand Vas River on the 21st of September 1865, and found a vessel there loading for London. He had lost everything but his journals; all the treasures in natural history which he had collected were gone. He brought home, however, his astronomical observations, which have been carefully examined by the most competent persons, and the map of western equatorial Africa has been made much more complete and correct than before. Du C. did not penetrate, on any of his journeys, much more than 240 miles in a direct line from the coast, but his dis-

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coveries have been numerous and important, and amongst them are about eighty new species of mammals and birds. No one now doubts the right of Du C. to be ranked among the most enterprising and truthful of travellers. The account of his second expedition to Africa is entitled "A Journey to Ashango-Land" (Lond. 1867). His ethnographical observations were published in "My Apingi Kingdom" (1870); and "The Country of the Dwarfs" (1872).

CHAIN, in Surveying (called Gunter's Chain, from its inventor), is a measure of 22 yards long, composed of 100 iron links, each of which is thus, 7·92 inches long. As an acre contains 4840 square yards, 10 square chains (22×22×10 = 4840 square yards), or 100,000 square links make an acre.

CHAIN-BRIDGE. See SUSPENSION BRIDGES.

CHAIN-CABLE. See CABLE.

CHAIN-MAIL, or Chain-Armor, much used in the 12th and 13th centuries, consisted of hammered iron links, connected one to another into the form of a garment. Such armor was much more flexible and convenient to the wearer than that which was formed of steel or brass plates, but was less fitted to bear the thrust of a lance.

CHAIN-SHOT, a nearly obsolete kind of ammunition, chiefly used in naval warfare, consisting of two balls connected by a short chain. The object of the chain is to destroy the rigging, &c., which otherwise might escape. As grape-shot has been found to serve the same end, the making of C.-S. has been discontinued.

CHAINS, on shipboard, are strong iron links or plates, bolted at the lower end to the ship-timbers, and having a block or *dead-eye* at the upper end. Their purpose is to fasten down the shrouds tightly. They are brought out laterally at the top by resting in the middle against the channels, which are broad, thick planks, very strongly fixed, and projecting horizontally from the side of the ship, one pair for each mast.

CHAINS, Hanging In. In atrocious cases it was usual for courts of justice in former times to direct the bodies of malefactors after execution to be hung in C. upon a gibbet near the spot where the crime was committed; but this, says Blackstone, "was no part of the legal judgment." The reasons commonly assigned for the practice are two: first, that it might strike terror into other offenders; and second, that it might afford "a *comfortable* sight to the relations and friends of of the deceased." This barbarous adjunct to capital punishment was not finally abolished till a very recent period, and it may surprise our readers to learn that two years after the passing of the Reform Bill, it was still in accordance with the law, if not with the custom of England. The act "to abolish the practice of hanging the bodies of criminals in chains" (4 and 5 Will. IV. c. 26), was passed on 25th July, 1834. The last case of hanging in C. mentioned as having occurred in Scotland, is that of Andrew Wilson, who poisoned his wife in 1755 (Hume, vol. ii., p. 482). See PUNISHMENTS and DISSECTION.

CHALA'ZA, in Botany, a membrane which unites the nucleus and integuments at the base of an ovule. It is traversed by vessels which supply nourishment to the ovule. It is often of a different color from the rest of the integuments, and is conspicuous in the ripened seed; but it is sometimes difficult to distinguish it, particularly in *orthotropal* seeds, when it is in contact with the *hilum*, the *foramen* or *micropyle* being at the opposite extremity of the seed. See OVULE and SEED.

The cords which bind the yolk-bag of an egg to the lining membrane at the two ends of the shell, and keep it near the middle as it floats in the albumen, are also called *chalazæ*. They appear to be formed of a peculiarly viscid albumen.

CHALCE'DON, a city of ancient Bithynia, at the entrance of the Euxine, opposite to Byzantium. It was founded 684 B.C. by a colony from Megara, and soon became a place of considerable trade and importance. It contained several temples, one of which, dedicated to Apollo, had an oracle. C. was taken by the Persians, suffered the vicissitudes of war during the strife for Grecian supremacy between the Athenians and Lacedæmonians, and finally merged into the Roman empire. During the Mithridatic war, it was the scene of a bold exploit of the Pontic sovereign. Having invaded Bithynia, all the wealthy Romans in the district fled for refuge to C., whereupon he broke the chains that protected the port, burned four

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ships, and towed away the remaining sixty. Under the empire it was made a free city, and was the scene of a general council, held 451 A. D. Chosroes the Persian captured it 616 A. D., after which it declined, until it was finally demolished by the Turks, who used its ruins to build mosques and other edifices at Constantinople. C. was the birthplace of the philosopher Xenocrates.

The *council* of C., to which allusion has been made, was the fourth universal council, and was assembled by the emperor Marcian, for the purpose of drawing up a form of doctrine in regard to the nature of Christ, which should equally avoid the errors of the Nestorians (q. v.) and Monophysites (q. v.). Six hundred bishops, almost all of the Eastern or Greek church, were present. The doctrine declared to be orthodox was, that in Christ there were two natures, which could not be intermixed (this clause was directed against the Monophysites), and which also were not in entire separation (this was directed against the Nestorians), but which were so conjoined, that their union destroyed neither the peculiarity of each nature, nor the oneness of Christ's person.

CHALCE'DONY (often misspelled *Calcedony*), a beautiful mineral of the quartz family, or rather a variety of quartz, from which it does not differ in chemical composition or in any essential character. It derives its name from Chalcedon in Bithynia, near which it is found in considerable abundance, and has been known by the same name from ancient times. It occurs in different kinds of rock, but most frequently in old lavas and trap-rocks, and is found in almost all parts of the world where these exist, or where there are boulders derived from them. It is common in Scotland, and specimens of great beauty are brought from Iceland and the Faröe Islands. It never occurs in crystals. It constitutes the whole or the principal part of many agates. It is generally translucent, sometimes semi-transparent, has not much lustre, and is in color generally white or bluish white, sometimes reddish white, sometimes milk-white, less frequently gray, blue, green, yellow, brown, or even black. Its fracture is even, or very slightly concholdal.—C. is much used in jewelry, for brooches, necklaces, and ornaments of all sorts, the largest pieces being sometimes made into little boxes, cups, &c. It was much used by the ancients, and many beautiful engraved specimens appear in antiquarian collections. Chalcedonies with disseminated spots of brown and red, were once very highly prized, and were called *Stigmites* or *St Stephen's-stones*. Petrified plants are sometimes found in C., in which they appear to have been encased whilst it was in course of formation. Specimens of C. are sometimes found enclosing a little water in the interior, which gives them a very beautiful appearance; but the water easily escapes, to prevent which, rings or other ornaments made of such stones are kept in distilled water, when not worn. The ancients set a very high value on these *enhydrites* (Gr. *en*, in, and *hydor*, water). The Vicentin was celebrated for producing them.

CHALCE'DONYX (or, erroneously, *Calcedonyx*), a name given to agates formed of cacholong, or a white opaque chalcedony, alternating with a grayish translucent chalcedony.

CHA'LCIS, the capital town of the island and government of Eubœa, Greece, situated on the Euripus, a strait separating the island from Bœotia, and which at this point is only 120 feet wide. The Euripus is divided into two channels, of unequal breadth and depth, by a rock, which is surmounted by a castle, partly of Venetian and partly of Turkish construction. A stone bridge, of some 70 feet in length, connects the rock with the Bœotian shore, while a wooden and movable bridge, of about 85 feet, unites it with Chalcis. C. is a place of very great antiquity, having been founded, as tradition asserts, before the Trojan war, by an Ionian colony from Athens. Its rise was rapid. It sent out numerous colonies, and was the centre of the trade of the western Mediterranean. Governed at first by an aristocracy, it fell into the hands of the Athenians, who in 506 B.C. divided the lands of C. amongst some of their own number. It subsequently fell under the power of the Macedonians and Romans, and was at this time a place of great military importance, nearly 9 miles in circumference, and had many fine temples, theatres, and other public buildings. Aristotle died at Chalcis. In the middle ages, it was prosperous under the Venetians, who held it for nearly three centuries, until its conquest by the Turks in 1470. The lion of St. Mark is or was until within recent years, still to be seen over the

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gateway between the bridge and the citadel. Not many ancient remains now exist at Chalcis. The streets are narrow, but the houses, many of which owe their origin to the Venetians, are substantial and spacious. Pop. (1870) 6447.

CHA'LCIS, a genus of Saurian reptiles, the type of a family called *Chalcidæ*, some of which are popularly termed snake-lizards, because of the resemblance to snakes in the elongated form of the body, the limbs being also remarkably small, so that this family forms one of the transition links between the Saurian and the Ophidian reptiles. The scales are rectangular, and arranged in transverse bands, without being imbricated or disposed like tiles. The *Chalcidæ* are natives of warm climates, both in the old and new worlds.

The name C. has also been bestowed on a genus of the order *Hymenoptera*, allied to the Ichneumons, which has become the type of a tribe or family, containing a vast number of species—1500 being supposed to exist in Britain—all of them of small size, many very minute, many of them very brilliant in their colors, and the larvæ of all of them parasitic in the larvæ or pupæ, some even in the eggs, of other insects. The chrysalis of a butterfly or moth often nourishes a great number of these parasites; and they become useful in preventing the excessive multiplication of species which destroy valuable plants.

CHALCO'GRAPHY, a pedantic term used to signify engraving on copper, compounded of the Greek words *chalkos*, brass or copper, and *grapho*, I write. The term is inaccurate when applied, as it often is, to engraving on other metals, such as steel and zinc. For zinc-engraving, the still more objectionable word *Zincography* has been invented.

CHALDÆ'A. See BABYLON, BABYLONIA.

CHA'LDEE. See ARAMÆA.

CHALDER, an old Scotch dry measure, containing 16 bolls. See BOLL.

CHA'LDRON (Lat. *caldarium*, a vessel for warm water), an old dry measure used in selling coal, and containing 36 heaped bushels. Coal is now sold by weight.

CHALEUR BAY, an inlet of the Gulf of St. Lawrence, between Gaspe, a district of Lower Canada, and New Brunswick, having a depth of 90 miles from east to west, and a width varying from 12 to 20. The Ristigouche, which enters the gulf from New Brunswick, at its very head, marks, at its mouth, the inter-provincial boundary.

CHA'LICE (Lat. *calix*, a cup). This ancient name for an ordinary drinking-cup has been retained for the vessels used for the wine in the holy sacrament. Chalices are commonly made of silver, but it was not unusual for them to be of gold, or gilt and jewelled. Chalices were also made of glass, crystal, and agate; but these substances have been abandoned, in consequence of their fragile nature. The C. is the attribute of St. John the Evangelist.

CHALK, a soft earthy variety of limestone or carbonate of lime, forming great strata, and claiming the attention of the geologist even more than of the mineralogist. It is generally of a yellowish-white color, but sometimes snow-white. It is easily broken, and has an earthy fracture, is rough and very meagre to the touch, and adheres slightly to the tongue. It generally contains a little silica, alumina, or magnesia, sometimes all of these. Although often very soft and earthy, it is sometimes so compact that it can be used as a building-stone; and it is used for this purpose either in a rough state, or sawn into blocks of proper shape and size. It is burned into quicklime, and nearly all the houses in London are cemented with mortar so procured. The silicious particles being separated by pounding and diffusing in water, it becomes whiting, of which the domestic uses are familiar to every one. Carpenters and others use it for making marks, which are easily effaced; the *black-board* and piece of C. are now common equally in the lecture-rooms of universities and in the humblest village-schools. C., perfectly purified, is mixed with vegetable coloring matters, such as turmeric, litmus, saffron, and sap-green, to form pastil colors; but vegetable colors which contain an acid are changed by it. See CRAYON. The *Vienna white* of artists is simply purified chalk. In a perfectly purified state, it is administered as a medicine to correct acidity in the stomach. C. is also extensively used as a manure. See LIME as a manure

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CHALK, Black, is a mineral quite different from common chalk, and apparently receives its name from resembling it in meagreness to the touch, in soiling the fingers, and in being used for drawing, writing, &c. It is also called DRAWING-SLATE. It is of a slaty structure, of a bluish or grayish-black color, easily cut and broken, and makes a perfectly black mark on paper. It is used for drawing, and as a black color in painting. It becomes red by exposure to heat. It is essentially a kind of clay (q. v.), and derives its color from carbon, which it contains. It is found in primitive mountains, in Spain, France, Italy, &c., also in the coal formation in Scotland.—BRIANCON CHALK and FRENCH CHALK are popular names for Soapstone (q. v.).—RED CHALK is *Ochry Red Clay-iron-ore*, consisting of clay and much peroxide of iron. It is of a brownish red color, and a somewhat slaty structure, the cross fracture earthy. The coarser varieties are used chiefly by carpenters for making marks on wood; the finer, by painters. It occurs in thin beds in clay-slate and grauwacke-slate in some parts of Germany.

CHALK-BEDS. See CRETACEOUS GROUP.

CHALKING THE DOOR, a mode of warning tenants to remove from burghal tenements, long known and still in use in Scotland. The practice is thus described by Mr Hunter in his valuable work on Landlord and Tenant: "A burgh-officer, in presence of witnesses, chalks the most patent door forty days before Whitsunday, which is held to be a legal warning. There is no execution at the parish church, but the officer makes out an execution of 'chalking,' in which his name must be inserted, and which must be subscribed by himself and two witnesses. This ceremony now proceeds simply on the virbal order of the proprietor, but anciently the interposition of a judge was requisite. In such a case, authority was given by one of the magistrates to the burgh-officer." That judicial authority is still assumed to lie at the root of the proceeding, is apparent from the fact, that the execution bears that the warning has been executed in her majesty's name and authority, and that of the magistrates of the burgh. The officer ought to notify to the tenant the object of his visit, though it is not perhaps indispensable that he should do so. The execution of chalking is a warrant under which decree of removal will be pronounced by the burgh-court, in virtue of which the tenant may be ejected on the expiration of a charge of six days. See EJECTMENT.

CHALKY ISLAND, in New Zealand, nea the south-west extremity of Middle Island, about lat. 46° s., and long. 166° 20' e. It takes its name from being composed of a mass of white limestone, and imparts the same to the adjacent bay of 16 miles in length, and also to one of the harbors of the inlet.

CHA'LLENGE. See DUEL.

CHALLENGE. See JURY.

CHA'LMERS, George, an eminent historical antiquary, was born at Fochabers, Morayshire, Scotland, in 1742. Having attended King's College, Aberdeen, and afterward studied law at Edinburgh, he went in 1768 to North America, where he practised as a lawyer till the breaking out of the war of independence. Being a keen loyalist, he returned to Britain, where he was appointed clerk to the Board of Trade in 1786. The duties of this office he continued to discharge with diligence and ability till his death in 1825. Before his appointment, he had distinguished himself by various publications in political economy; and for some time after he devoted himself chiefly to editing the works of various authors and writing biographies. His great work is his "Caledonia; an Account, Historical and Topographical, of North Britain;" a production displaying profound research into the history of Scotland, and abounding in varied erudition. It was intended to be completed in 4 vols. 4to. The first volume, containing the historical part, appeared in 1807; of the other three, which were destined to give an account of the several counties, the second, embracing Roxburghshire, Berwickshire, Haddingtonshire, Edinburghshire, Linlithgowshire, Peeblesshire, and Selkirkshire, appeared in 1810; the third containing the counties of Dumphries, Kirkcudbright, Wigton, Ayr, Lanark, Renfrew, and Dumbarton, appeared in 1824. A fourth volume is understood to have been left at his death, ready for the press.

Among his other publications are: "Political Annals of the United Colonies" (Lond. 1780); "On the Comparative Strength of Great Britain, during the present

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and the four preceding Reigns" (Lond. 1782, 1786, 1794, 1803, 1812); "A Collection of Treaties between Great Britain and other Powers" (2 vols., Lond. 1790); "Life of Daniel Defoe" (Lond. 1786); "Life of Thomas Ruddiman" (1794); "Life of Mary Queen of Scots" (Lond. 1818); editions of the works of Allan Ramsay (1800), and of Sir David Lindsay (1806), with memoirs; also various pamphlets apologising for those, himself included, who had believed in the authenticity of the Shakspeare manuscripts forged by Mr. Ireland.

CHALMERS, Thomas, D. D., LL. D., was born at Anstruther, in Fifeshire, 17th March 1780, educated at the university of St Andrews, and in his 19th year licensed to preach the gospel. In 1803 he was ordained minister of the parish of Kilmany, in Fifeshire, about 9 miles from St Andrews. At this period, his attention was entirely absorbed by mathematics and natural philosophy, to the neglect of the studies appertaining to his profession. To gratify his love of scientific pursuits, he even formed mathematical and chemistry classes in St Andrews during the winter of 1803—1804, and by his wonderful enthusiasm and lucidity of exposition excited intense interest, and obtained for himself a great reputation. In 1808 he published an "Inquiry into the Extent and Stability of National Resources," which proved his capacity for dealing with questions of political economy. Shortly after this, certain domestic calamities, and a severe illness of his own, opened up the fountains of his soul, and rendered him keenly susceptible to religious impressions. Having to prepare an article on Christianity for Brewster's "Edinburgh Encyclopædia," he commenced an extensive study of the evidences, and rose from his investigations convinced that Christianity was a *fact*, and the Bible the veritable "word of God." Then the great genius of the man broke forth like sunshine. He grew earnest, eloquent, devout, and faithful to his pastoral duties. In July 1815, he was translated to the Tron Church and parish, Glasgow, where his magnificent oratory took the city by storm. His "Astronomical Discourses" were probably the most sublimely intellectual and imaginative that had ever been preached in a Scottish pulpit. They were published in 1817, and had a prodigious popularity. During the same year he visited London, where his preaching excited as great a sensation as at home. But C.'s energies could not be exhausted by mere oratory. Discovering that his parish was in a state of great ignorance and immorality, he began to devise a scheme for overtaking and checking the alarming evil. It seemed to him that the only means by which this could be accomplished was by "revivifying, remodelling, and extending the old parochial economy of Scotland," which had proved so fruitful of good in the rural parishes. In order to wrestle more closely with the ignorance and vice of Glasgow, C., in 1819, became minister of St John's parish, "the population of which was made up principally of weavers, laborers, factory-workers, and other operatives." "Of its 9000 families," says Dr Hanna, "more than 800 had no connection with any Christian church, while the number of its uneducated children was countless." We have not space to narrate at length how vast and successful were the labors of Chalmers. It is sufficient to say, that in pursuance of his favorite plan, he broke up his parish into 25 districts, each of which he placed under separate management, and established two week-day schools, and between 40 and 50 local Sabbath schools, for the instruction of the children of the "poorer and neglected classes," more than 1000 of whom attended. In a multitude of other ways he sought to elevate and purify the lives of his parishioners. While in Glasgow, C. had matured his opinions relative to the best method of providing for the poor. He disliked the English system of a "compulsory assessment," and preferred the old Scotch method of voluntary contributions at the church-door, administered by elders. The management of the poor in the parish of St. John's was intrusted to his care by the authorities, as an experiment, and in four years he reduced the pauper expenditure from £1400 to £280 per annum.

But such herculean toils began to undermine his constitution, and in 1828 he accepted the offer of the Moral Philosophy chair in St Andrews, where he wrote his treatise on the "Use and Abuse of Literary and Ecclesiastical Endowments" (1827). In the following year, he was transferred to the chair of Theology in Edinburgh, and in 1832 published a work on political economy. In 1833 appeared his Bridgewater treatise, "On the Adaptation of External Nature to the Moral and Intellectual Constitution of Man." It was received with great favor, and obtained for the author many literary honors; the Royal Society of Edinburgh electing him a fellow, and the

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French Institute a corresponding member, while the University of Oxford conferred on him the degree of D.C.L. In 1834, he was appointed convener of the Church-extension Committee; and after seven years of enthusiastic labor, announced that upwards of £300,000 had been collected from the nation, and 220 new churches built. Meanwhile, however, troubles were springing up in the bosom of the church itself. The Evangelical party had become predominant in the General Assembly, and came forward as the vindicators of popular rights; the struggles in regard to patronage between them and the "Moderate" or "Erastian" party became keener and more frequent, until the decision of the civil courts in the famous "Auchterarder and Strathbogie" cases brought matters to a crisis; and on the 18th of May 1843, C., followed by 470 clergymen, left the church of his fathers, rather than sacrifice those principles which he believed essential to the purity, honor, and independence of the church. See articles DISRUPTION and FREE CHURCH. The rapid formation and organisation of the Free Church were greatly owing to his indefatigable exertions, in consequence of which he was elected Principal of the Free Church College, and spent the close of his life in the zealous performance of his learned duties, and in perfecting his "Institutes of Theology." He died suddenly at Morningside, Edinburgh, May 30, 1847.

This is not the place for a criticism on the works of C., which extend to more than 30 vols. It is sufficient to say, that they contain valuable and, in some cases, original contributions to the sciences of natural theology, Christian apologetics, and political economy; while on minor topics, such as the church-establishment question, they exhibit both novelty and ingenuity of argument. As an orator, C. was unique and unrivalled. We read of men, in the history of the Christian church, whom we can believe to have been as eloquent, impassioned, and earnest, but nowhere do we encounter a man in whom intellect, feeling, and imagination were so harmoniously combined—a nature so "nobly planned, to warn, to comfort, and command." Scotland never produced a greater or more lovable soul, one more gentle, guileless, genial-hearted, or yet more fervid, from the strength of a resolute and irresistible will, before whose impetus difficulties were dashed aside as by a torrent. There have been some loftier and more purely original minds in Scotland than C.'s, but there has never been a truer one, nor a heart whose Christian faith and piety were more intense, sincere, and humane.

CHÂLON-SUR SAÔNE, a town of France, in the department of Saone-et-Loire, about 33 miles north of Mâcon. It is situated on the right bank of the Saone, at the point where that river is joined by the Canal-du-Centre, which unites the Saone with the Loire, and secures C. an extensive traffic with the central districts of France, as well as with the Mediterranean and Atlantic. The town is generally well built, good quays line the river, along which also the finest houses extend. Vineyards, wood, meadows, and cultivated fields surround and add variety and beauty to the situation. Its manufactures include hats, hosiery, vinegar, oil, pottery, jewellery, and imitation pearls; and it has a large trade in the agricultural and other produce of the district. Steam-boats navigate the Saone from C. downwards. Pop. (1872) 18,951. C. occupies the site of the ancient *Cabillonum* or *Caballinum*.

CHÂLONS-SUR-MARNE, a town of France, in the department of Marne, 107 miles east of Paris by railway. It stands on the right bank of the river Marne, which is here crossed by a handsome stone bridge. C. is old; and the houses consist chiefly of timber, lath, and plaster. The situation, however, is agreeable, and the town contains some fine public buildings, the principal of which is the cathedral, in the sanctuary of which there is one of the finest grand altars in France. On the east side of the town there is the splended *Promenade du Jard*, or park, which covers 19 acres. C. has manufactures of woollen, cotton, leather, &c., and a considerable trade in grain, hemp, rape-seed oil, and Champagne wine. Pop. (1872) 15,186. Previous to the union of Champagne with France in 1284, the population numbered about 60,000. In 1856, Napoleon III. formed the celebrated camp of C., to the north-east of the town, which was occupied during the Franco-Prussian war by Canrobert, and afterwards by MacMahon. On the night of August 21, 1870, MacMahon withdrew his troops; and next day the town was occupied by the Germans.

CHALYBÆ'US, a genus of birds very closely allied to the Baritahs (q. v.), but having a rather thicker bill, and the nostrils pierced in a broad membraneous space.

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The species are natives of New Guinea, and are birds of the most beautiful plumage, remarkable for the brilliancy of their metallic tints, and particularly for the resemblance to burnished steel, to which they owe their name (Gr. *chalyps*, *-ybos*, steel). On this account, they are sometimes included under the name of Birds of Paradise; and the skin of *C. paradiseus*, deprived of its feet, is sold as that of a Bird of Paradise.

CHALYBÆUS, Heinrich Moritz, a German philosopher, was born 3d July 1796, at Pfaffroda in Saxony, and educated at Leipsic. After spending some years in teaching, he was appointed in 1839 professor of philosophy in the university of Kiel, where he remained till his death in 1862. His chief works are the "Historiche Entwickelung der speculativen Philosophie von Kant bis Hegel" (1836—English translations by Edersheim and Tulk); "System der speculativen Ethick" (1850); "Philosophie und Christenthum" (1853); and "Fundamentalphilosophie" (1861).

CHALY'BEATE WATERS are those which contain a considerable proportion of iron in solution. They are of two kinds, *Carbonated* and *Sulphated*. The *Carbonated C. W.* contain carbonate of iron (FeO,CO_2) dissolved in excess of carbonic acid, and may be recognised by forming an ochry deposit of red oxide of iron (Fe^2O_3) on the surface of the stones near the mouths of the springs, owing to the escape of the carbonic acid on exposure to the air. Islington Spa near London, Tunbridge Wells, and Oddy's Saline C. W. at Harrowgate, are examples of this class. Where an excess of carbonic acid is present, communicating a sparkling aspect to the water and an acidulous taste, as at Pyrmont, and other places, the term *acidulo-chalybeate* or *acidulo-ferruginous* is applied. The *Sulphated C. W.* contain sulphate of iron (FeO,SO_3) dissolved in them, and examples of this class are afforded at the Isle of Wight (the Sand Rock Spring), Vicars Bridge, Moffat, &c. C. W. are characterised by a more or less inky or styptic taste; by becoming of a purplish black tint when infusion of galls or tea, and some varieties of wine, are added; and by giving a pale-blue color on the addition of a few drops of ferrocyanide of potassium (yellow prussiate of potash). C. W. are of great service in cases of debility, and the *acidulo-carbonated* kind being lighter on the stomach, is generally preferred; but all C. W. are to be avoided in plethoric, febrile, and inflammatory conditions of the system.

CHA'MA, a genus of lamellibranchiate mollusks. The shell consists of two unequal valves, having two hinge-teeth in the one valve, and one in the other. The general form of the shell approaches to orbicular. The shell is generally thick, and is foliated with leaf-like projections, which arise in a somewhat regular manner from its surface; these and the colors of some of the species combining to make them very beautiful. The shells of the *Chamæ* are often called *Clams* or *Clamp*-shells, a name which they share with some of the *Pectens*, *Spondyli*, &c. They are found only in the seas of warm climates, none further north than the Mediterranean. The Linnæan genus C. contained many species now removed to other families, but the restricted genus C. is the type of a family *Chamidæ*. Thirty fossil species have been referred to C., four from the Cretaceous period, and twenty-six from the Tertiary.

CHAMA'DE. See PARLEY.

CHAMÆ'ROPS, a genus of palms, with fan-shaped leaves, less exclusively tropical than palms are in general, and of which one species, *C. humilis*, is the only palm truly indigenous to Europe. It extends as far north as to the neighborhood of Nice. It is sometimes called the PALMETTO. The flowers are in spathes, about 6—8 inches long; the fruit is a triple blackish spongy drupe, which is eaten, as are also the young shoots. This palm is so tolerant of a cold climate, that a specimen has lived in the open air in the Botanic Garden of Edinburgh for more than fifty years, with the protection of matting in very severe winters. In its native regions, the leaves are much used for thatching, and for making brooms, hats, chair-bottoms, &c. They abound in an excellent fibre, which the Arabs mix with camel's hair, and make into tent covers: cordage, and sometimes sailcloth, are made of it in Spain; it is imported into France, and used for making carpets, under the name of *African Hair*. The French in Algeria make paper and pasteboard of it; and it is supposed that it may prove a valuable commercial commodity, as a material for paper-making. —Other species of the genus abundant in India, China, &c., serve similar purposes,

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and deserve attention in connection with paper.—To this genus belongs also the West Indian palm, which yields the material for chip-hats (see BRAZILIAN GRASS); and the Palmetto (q. v.) of North America is by some botanists referred to it.

CHAMALA'RI, a peak of the Himalaya between Tibet and Bhotan, in lat. 28° 4′ n., and long. 90 e., said to have an elevation of 27,200 feet, or more than five miles and a furlong.

CHA'MBER, of a piece of artillery, or small arm, is a contracted part of the bore, at the breech end. The C. contains the charge of powder, but is too small to contain the shot or shell. Some of these cavities are spherical, some cylindrical, some conical with a hemispherical termination, and some pear-shaped. Carronades and shell-guns are usually chambered. The charge just fits the C., and the ball or shell comes in contact with it. Chambered guns are more slow to load and fire than those which are not chambered; and therefore the adoption of this form depends very much on the kind of service in which the weapon is to be employed. Its primary use is in kinds of ordnance in which the charge is small compared with the calibre, and in which, consequently, there would be great loss of power unless the charge were confined within a comparatively limited space at the time of the explosion.

CHAMBER-COUNSEL, a barrister or advocate who gives opinions in his own chambers, but does not, or rarely does, plead in court.

CHAMBER OF COMMERCE, a body of merchants and traders, associated for the purpose of promoting the interests of its own members, of the town or district to which the society belongs, and of the community generally, in so far as these have reference to trade and merchandise. Of the means by which these objects are sought to be accomplished the following may be mentioned as the most prominent: 1. By representing and urging on the legislature the views of their members in mercantile affairs; 2. By aiding in the preparation of legislative measures having reference to trade, such, for example, as the Bankrupt Acts; 3. By collecting statistics bearing upon the staple trade of the district; 4. In some places by acting as a sort of court of arbitration in mercantile questions; 5. By attaining by combination advantages in trade which might be beyond the reach of individual enterprise.

These institutions are of continental origin, and, like so many others which England has borrowed from that source, were first introduced into Scotland. The oldest C. of C. in France is that of Marseille, which dates from the end of the 14th or commencement of the 15th century. This chamber was invested with very remarkable powers. It shared in the municipal jurisdiction, and in the administration of justice in mercantile questions. It was several times suppressed and re-established, and it was not till 1650 that its powers were fixed, and that it received its ultimate organization. The second chamber in France was that of Dunkerque, which was established in 1700. The same year a council-general of commerce was instituted at Paris, which, in addition to six councillors of state, consisted of twelve merchants or traders, delegated by the principal commercial towns of the kingdom, an arrangement which led within the next few years to the formation of chambers of commerce everywhere in France. We thus find that the chamber at Lyon was instituted in 1702, those of Rouen and Toulouse in 1703, of Montpellier in 1704, of Bordeaux in 1705, &c. By an order of council of Aug. 30, 1702, a direct relation was established between these various chambers and the central Council of Commerce. These chambers were all suppressed by a decree of the National Assembly in 1791, but they were re-established by a consular edict in 1802, which fixed the population of the towns in which they might be established, and the number of their members, who were to be chosen from amongst the merchants who had carried on trade in person for a period of not less than ten years. Sixty of the best known merchants, presided over by the prefect or the maire, were charged to elect the members of these new chambers. They then presented to the government two candidates for the office of member of the general council of commerce, instituted at Paris under the Minister of the Interior. This organization was again modified in 1832, and still later by the ordonnances of September, 1851, and August, 1852, by which these bodies are now regulated. In accordance with that decree, the members of these bodies are now elected by the chief merchants

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of each town chosen for that purpose by the prefect. Their number cannot be less than 9, nor more than 21. They hold office for six years, one-third of their number being renewed every two years, but the members resigning being re-eligible. The functions now assigned to these chambers in France are—to give to the government advice and information on industrial and commercial subjects, to suggest the means of increasing the industry and commerce of their respective districts, or of improving commercial legislation and taxation; to suggest the execution of works requisite for the public service, or which may tend to the increase of trade or commerce, such as the construction of harbors, the deepening of rivers, the formation of railways, and the like. On these and similar subjects, the advice of the chambers, when not volunteered, is demanded by the government. In most of the other countries of continental Europe there are similar institutions for the purpose of conveying information and advice to the central government, and making it acquainted with local feelings and interests in commercial matters.

The oldest C. of C. in Great Britain is believed to be that of Glasgow, which was instituted 1st January 1783, and obtained a royal charter, which was registered at Edinburgh on the 31st of the same month. That of Edinburgh was instituted in 1785, and incorporated by royal charter in 1786. The Edinburgh C. of C. was the first public body which petitioned for the abolition of the Corn Laws, and the adoption of free-trade principles; and stood almost alone in the United Kingdom in advocating the Suez Canal project. It also originated the movement that government should undertake the telegraph service in connection with the Post-office. Six hundred of the bankers, merchants, and ship-owners of Edinburgh and Leith constitute the Chamber. The Manchester Chamber, since so famous for its exertions in the cause of free-trade, was not established till 1820, and for many years it continued to be the only institution of the kind in England. Its members number about 400. In Hull there has been a C. of C. since 1837, but those of Liverpool, Leeds, and Bradford, notwithstanding the great trading and manufacturing interests of these towns, were not established till 1850, in which year, strangely enough, a similar institution was established in South Australia. The Liverpool C. of C. numbers nearly 600. The annual income of the Manchester chamber is upwards of £600, that of Liverpool about £800, contributed entirely by the subscriptions of members, amounting generally to £1, 1s. a year. There are now Chambers of Commerce in all the great mercantile towns of Great Britain and Ireland, and in 1860 there was established an "Association of Chambers of Commerce of the United Kingdom." In Canada, there is a Dominion Board of Trade, which consists of the Chambers of Commerce, or Boards of Trade, as they are indifferently called, of a dozen of the most important cities of the Dominion.

CHA'MBERLAIN, Lord, or King's C. as he was formerly called, has been one of the principal officers of state from very early times, and for centuries he was an influential member of the government. He has the function of endorsing the king's answer on petitions presented to him, and very often of communicating his majesty's pleasure to parliament and to the council. He was always a member of the council himself, *ex officio*. Though he has long ceased to have any share in the responsibilities of government, the C. is still an officer of very high standing in the royal household. He has control over all the officers and servants of the royal chambers, except those of the bedchamber, over the establishment attached to the Chapel Royal, the physicians, surgeons, and apothecaries of the household. The C. has further the oversight of the Queen musicians, commedians, trumpeters, messengers, &c.; and all tradesmen and artificers in her service are appointed by him. When the office of Keeper of the Great Wardrobe was abolished in 1782, the duties of providing the state robes of the royal family, the household, and officers of state, devolved on the lord chamberlain. All theatres in towns in which a royal palace is situated require to be licensed by the Lord C., and no new play can be performed anywhere without his licence. All persons desiring to be presented at levees or drawing-rooms, require to send their cards to the Lord C., and it is his duty to see that the persons thus applying are entitled by station and character to be presented to the Queen. The C. also issues her Majesty's invitations to balls, parties, &c. In accordance with ancient custom, the Lord C. is still a member of the Privy Council. His salary is £2000 a year, but his tenure of office depends on that of the political party to which he belongs.

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The Vice-Chamberlain is the deputy and assistant of the Lord C., and in his absence excercises the full authority which belongs to his principal. His office existed in the time of Richard II. He is also dependent on the administration, and is usually a member of the Privy Council. His salary is £924 per annum.

CHAMBERLAIN, The Lord Great, is a hereditary officer of great antiquity, and formerly of great importance. He has the government of the palace at Westminster, and upon solemn occasions, the keys of Westminster Hall and of the Court of Requests are delivered to him. At these times the Gentleman Usher of the Black Rod, the Yeoman Usher, and the door-keepers are under his orders. At coronations, state trials, banquets and the like, the fitting up of the Hall devolves on him. When the Queen goes to parliament he delivers the sword of state to any member of the administration whom he chooses, to be borne before her Majesty, he himself walking on her right hand. During the sitting of parliament he has charge of the House of Lords, and issues tickets of admission on the opening or prorogation of parliament. Some fees and perquisites belong to him. This office, conferred by Henry I. on Alberic de Vere, was inherited by female succession from the De Veres, Earls of Oxford, by the Bertics, and is now held conjointly by Lady Willoughby de Eresby and the Marquis of Cholmondeley, in right of their mothers, sisters and co-heirs of Robert, fourth Duke of Ancaster. They discharge the duties alternately in each succeeding reign, a lady acting by deputy. Lord Aveland is at present deputy Great Chamberlain.

CHAMBERS, Ephraim, the compiler of the first English encyclopædia. He was born at Kendal in the latter part of the 17th c., and began life as an apprentice to a globe-maker in London, where he conceived the idea of his encyclopædia. The first edition of the work, in 2 vols., folio, appeared in 1728; ten years later, the 2d appeared; and in the year following, the 3d. The 4th was issued in 1741, a year after the editor's death. A 5th appeared in 1746, and a 6th, with new matter, in 1750. This work forms the basis of Dr Rees' Cyclopædia in 45 quarto vols., and may be considered as the forerunner of the now countless publications of an encyclopædic character (see ENCYCLOPÆDIA).

CHAMBERS, William and Robert, the editors and publishers of this "Encyclopædia" and other works; born at Peebles, W. in 1800, R. in 1802. Bearing up against the difficulties of his early life, W. C. began business as a bookseller in Edinburgh, 1819; afterwards adding printing to his business. Between 1825 and 1830, he wrote the "Gazetteer of Scotland," 1 vol.; and the "Book of Scotland," 1 vol. R. C. also began business as a bookseller in Edinburgh, and from 1823 to 1830 wrote successively the "Traditions of Edinburgh," 2 vols.; "Popular Rhymes of Scotland," 1 vol.; "Picture of Scotland," 2 vols.; and "Histories of Rebellions in Scotland, and Life of James I.," 5 vols). Next, he edited "Scottish Ballads and Songs," 3 vols.; and "Biography of Distinguished Scotchmen," 4 vols. His "Traditions of Edinburgh," procured him the friendship of Sir Walter Scott, who contributed various memoranda for the work. W. C. projected "Chambers's Edinburgh Journal," and that periodical was commenced on the 4th of February 1832, about six weeks in advance of the "Penny Magazine," and may be considered the pioneer of that class of cheap and popular periodicals of a wholesome kind now so generally diffused. The success of the "Journal" was materially promoted by the essays, moral and humorous, of R. C., who from the first was an able collaborateur. United from this period in the peculiar profession of writing, editing, printing, and publishing, W. and R. C. issued a series of works designed for popular instruction, including the "Journal" (now amounting, in its different series, to 65 vols.). Among these works are "Chambers's Information for the People," 2 vols.; "Chambers's Educational Course," 150 vols.; "Cyclopædia of English Literature," 2 vols.; "Miscellany of Useful and Entertaining Tracts," 20 vols.; "Papers for the People," 12 vols., and the present "Encyclopædia," 10 vols. In conducting these laborious undertakings, they necessarily depended on a number of accomplished literary assistants. In 1849, W. C. acquired the estate of Glenormiston in Peeblesshire, and a few years afterwards he founded and endowed an *Institution* in his native town for purposes of social improvement (see Peeblesshire). His later productions are—"Things as they are in America," 1 vol., (the result of a visit to the United States in 1853); the "Youth's Companion and Counsellor," 1 vol.; "History of Peeblesshire," 1 vol. 8vo

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(1864); pamphlets on "Improved Dwellings" and "Co-operation among the Working Classes;" "Wintering at Mentone," written from personal knowledge of the place during two successive visits; "France: its History and Revolutions," 1 vol. (1871); "Memoir of Robert Chambers, with Autobiographic Reminiscences," 1 vol., and "Ailie Gilroy," a Scottish story, 1 vol. (1872). More lately, "Stories of Remarkable Persons," 1 vol., and "Stories of Old Families," 1 vol. Twice elected Lord Provost of Edinburgh, W. C. occupied that office for four years (1865—1869), during which he promoted several important public acts, including one for the improvement of the older part of the city. R. C. latterly wrote a work on "Ancient Sea Margins;" after which appeared his "Domestic Annals of Scotland," 3 vols. He also edited the "Life and Works of Robert Burns," 4 vols. A collection of his historical and miscellaneous papers was issued under the title of "Select Writings of Robert Chambers," 7 vols. His latest production was the "Book of Days," a most elaborate and exhaustive work in two large volumes, the preparation of which so injured his health, that he relinquished all further literary exertion. In 1863, he received from the university of St Andrews the honorary distinction of LL.D. R. C. died at St Andrews, 17th March 1871, leaving a high character for literary application, integrity, and geniality of disposition. In 1872, W. C. received the honorary distinction of LL.D. from the university of Edinburgh. Engaged in miscellaneous literary labor, he remains head of the firm of W. and R. C., which owns an extensive printing and publishing establishment in Edinburgh, and a publishing establishment in London. The whole of the works issued by W. and R. C. aim at popular instruction, free of all political or sectarian bias. Perhaps their greatest effort in these respects has been the present "Encyclopædia."

CHAMBERS, Practice before a Judge or Vice-chancellor at. It is to applications to the court in *banc* alone that the name of motions is properly given. But there are certain matters of subordinate importance, regarding which applications are made to a single judge at chambers, who decides in a summary way on the pleadings.

CHAMBERRY, a town of Savoy, of which it is the capital, beautifully situated in a rich vine-clad valley, between two ridges of hills, about 45 miles west-south-west of Geneva. Though situated at an elevation of nearly 1000 feet above the sea, the climate of C. is mild; the scenery around, with the river Leysse flowing through the valley, is exceedingly fine. The town itself, however, is dull and uninteresting. Some towers and other fragments of the old castle of the Dukes of Savoy, which dates from the 13th c., still remain. C. has manufactures of silk-gauze, soap, leather, hats, lace, and a trade in silk, wine, &c. Pop. (1872) 18,417. From the middle of the 16th c. to the peace of Utrecht, 1718, C. was under the dominion of France; and again from the Revolution to the Congress of Vienna, 1815, when it was restored to the House of Savoy; but in 1860, by the cession of Savoy, it has again come under the rule of France.

CHAMBORD, a celebrated royal castle of France, in the department of Loir-et-Cher, situated in the midst of a vast walled park 21 miles in circumference, about 12 miles east of Blois. Its foundation was laid in 1526, by Francis I., who employed 1800 men constantly in its erection until his death. The work was continued with less zeal by his successors, Henri II., Henri III., Charles IX.; and Louis XIV. and Louis XV. also made some additions to it. The building, which marks the transition between the fortified castle and Italian palace, is surmounted by a vast number of turrets, minarets, and cones; its most prominent features, however, being six enormous round towers, each 60 feet in diameter. The double spiral staircase in the central tower is of great architectural interest, being so contrived that parties pass up and down without meeting each other. The castle has no less than 440 chambers. C. was the scene of the gallantries of Francis I. Here Henri II., Louis XIII., and Louis XIV. resided; and at one of the brilliant fêtes given at the castle by the latter, Molière performed, for the first time, his play of the "Bourgeois Gentilhomme." Among the other occupants of C. were Marshal Saxe, Stanislaus, king of Poland, and Marshal Berthier, upon whom it was bestowed by Napoleon I. It was bought from Berthier's widow by a number of legitimists, and presented to the Duc de Bordeaux, who is hence called Compte de C. (q. v.).

CHAMBORD (Henri Charles Ferdinand Marie Dieudonné d'Artois, Duc de Bordeaux), Comte de, the representative of the elder branch of the House of Bourbon,

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and of its claims to the French throne, was born in Paris, September 29, 1820. He is the grandson of Charles X., and the son of the Duke of Berri, who was murdered by Louvel, February 14, 1820. The Duke of Angoulême, Charles X.'s eldest son, being childless, the Duke of Berri was heir-presumptive; and as, at his death, he left only a daughter, the joy was great when, seven months after, his widow gave birth to a prince, who received the title of Duke of Bordeaux—that of Comte de C., by which he has latterly been known, being derived from the Castle of C. (q. v.), presented to him at his baptism. He was baptised amid circumstances of great pomp with water brought by M. de Châteaubriand from the river Jordan, and received the appellation of *l'Enfant du Miracle* ("the Miraculous Child"). When Charles X. abdicated the crown at the revolution in 1830, he did so in favor of his grandson, the Duke of Bordeaux. The people, however, insisted on the "Citizen King," and the elder Bourbons were banished. On the death of Charles X., the Duke of Angoulême assumed the title of Louis XIX., and another party proclaimed the Duke of Bordeaux king; but at last a reconciliation was brought about by Prince Metternich. In 1839, the prince visited Italy, accompanied by his mother, and was received by the petty courts with great distinction. After the death of the Duke of Angoulême in 1844, the heads of the different factions of legitimists met to pay their united homage, and the Duke of Bordeaux made a "pilgrimage to Belgrave Square" to receive it. In 1846, he married the eldest daughter of the Duke of Modena, who had never acknowledged the monarchy of July. After the revolution of 1848, many legitimists were returned to the National Assembly. In 1850, the Duke of Bordeaux, or Count of C., as he styles himself, appeared at Wiesbaden, where a congress of his adherents assembled to consult as to their future policy. As the Count of C. is without heirs, a union, or "fusion," as it is called, of the partisans of the elder Bourbons with the Orleanists was effected, but no attempt made to carry out the arrangement. After the capitulation of Paris in 1871, the Count of C. returned to France, and, under the title of Henry V., issued a proclamation, in which he promised, if placed by the nation at the head of its affairs, to maintain the temporal power of the pope. Neither this nor subsequent manifestoes have induced the French people to accept of him as their king.

CHAMBRE ARDENTE ("the Fiery Chamber"), a name given at different times in France to an extraordinary court of justice, probably on account of the severity of the punishments which it awarded, the most common being that of death by fire. In the year 1535, Frances I. established an Inquisitorial Tribunal, and a Chambre Ardente. Both were intended for the extirpation of heresy. The former, of which the pope was a corresponding member, searched out, by means of spies, cases of heresy, and instructed the processes; while the latter both pronounced and executed the final judgment. Under Henri II., the activity of the C. A. received a new impulse, the entrance of that monarch into Paris on the 4th July 1549 being signalised by the burning of several heretics. But Francis himself, gallant and gay, as courtly history represents him, also seemed to relish a spectacle of this kind, for on various occasions he and his mistress presided at a burning. By and by, the C. A. relaxed in its penalties, and a cry was got up among the more bigoted Roman Catholics that it was conniving at heresy. This seems to have roused the "lurking devil" in its members, and in order to wipe away the reproach, they commenced a series of unheard-of cruelties, which, along with other events, contributed to originate the religious war of 1560. In 1679, Louis XIV. employed it for a new and more praiseworthy purpose—viz., to investigate the numerous reports of poisoning cases which the trial of the Marchioness Brinvilliers (q. v.) caused to be circulated. Many persons of the first rank, such as the Maréchal de Luxembourg, and the Princess Louise of Savoy, were examined on suspicion, but no one was executed except the pretended sorcerer, Voisin (1680), after whose time the C. A. ended its activity.

CHAMBRE INTROUVABLE (Fr. unfindable chamber; i. e., the chamber the like of which is not to be found again) was the name sarcastically given to that Chamber of Deputies in France which met after the second return of Louis XVIII. (July 1815), and which, by its fanatical royalty, began to throw the country and society anew into commotion. The former chamber, which had shewn much moderation, had been dissolved under the influence of the court party; and the ministry,

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led by Talleyrand, had done everything to procure for the ruling party at least a manageable chamber adapted for business. The number of the deputies was arbitrarily raised from 259 to 392; and to secure the victory of a complete restoration, all rushed forward who saw in the constitutional charter an encroachment on their privileges and pretensions. When it is considered, in addition, that the elections, at least in the departments of the south, took place under terror and the sanguinary outrages of a populace in a state of political and religious excitement, that the press was stifled, and the people deprived of all freedom of expression by the foreign armies, ultra-royalism could not fail to be completely triumphant. When the ministers saw this startling result, they did not venture to open the session; they resigned, and gave place to the Richelieu ministry. Then broke out the most frightful excesses in the southern provinces. At the elections in Nimes (23d August), more than 100 persons were killed by the royalist bands. At last, on 7th October, the king opened the chamber, on which he enjoined quietness and moderation; and it appeared as if it did take this advice to heart for an instant. But when in one of the first sittings Boyer d'Argenson asked for the intervention of the chamber in behalf of the Protestants, who were being slaughtered in the south by the ultra-royalist bands, the speaker was called to order, and the chamber from that time ceased to observe any bounds or moderation. The fanatical legislation of this chamber inspired the ministers, the king, and especially the Emperor Alexander, with so much aversion and apprehension, and also met so decidedly with the disapprobation of all peaceful and sincere friends of the throne, that the news of its dissolution, on 5th April, 1816, was received with universal rejoicing. The electorial law of 5th February, 1817, prevented the return of a similar chamber; and it was not till by the modified electoral law of 1820, that ultra-royalism regained a predominating influence in Parliament. It is said that Louis XVIII. first used the epithet *Chambre Introuvable* in an ironical sense, and that the majority of the chamber took it seriously as a compliment.

CHAME'LEON, a southern constellation within the antarctic polar circle, and containing nine stars.

CHAMELEON (*Chamæleo*), a genus of saurian reptiles, constituting a distinct family, of very peculiar form and structure, and on various accounts highly interesting. The body is much compressed; the dorsal line sharp, in some of the species rising into an elevated crest; the back of the head is also elevated into a sort of cone. The neck is very short and does not admit of the head being turned, for which, however, compensation is found in the remarkable powers of motion possessed by the large prominent eyes, which move independently of one another, and are covered with a membrane pierced only with a small hole for the pupil to look through. There are no external ears. The skin is not covered with scales, but, like shagreen, rough with granules. The legs raise the body rather higher than in most of the saurians; the toes, both of the fore and hind feet, are divided into two sets, one directed forward, and the other backward, so that each foot has the power of grasping like a hand. The tail is long and prehensile. The lungs are very large, and are connected with air-cells that lie among the muscles and beneath the skin, so that the animal has a remarkable power of inflating itself with air. The tongue is remarkably extensile, and is the organ by which the animal seizes the insects which constitute its food, being darted at them with unerring aim, whilst a viscous saliva causes them to adhere to it, and they are carried with it into the mouth. Chameleons are slow in their movements, except those of the eyes and tongue, and remain long fixed in one spot, awaiting the approach of insects, upon which they seize on their coming within reach. They all live among the branches of trees. Their power of fasting is great, and along with their gulping of air in respiration, and their habit of inflating themselves with air, gave rise to the fable, current among the ancients and until recent times, of their living on air. Their celebrated power of changing color is not equally fabulous, and perhaps it if would be rash in the present state of knowledge on the subject to assert how far it has been exaggerated. It is probably in part under the control of volition, and may be used, as has been asserted, to render the animal less easy of observation, by assimilating it to the color of surrounding objects; it may depend in part on the action of light; it is certainly connected with the fear and other passions of the

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creature. Milne Edwards has discovered that it depends upon the presence of two differently colored layers of pigment in the skin.

Chameleons are natives of the warm parts of the Old World, but are most abundant in Africa. One species is found in some parts of the south of Europe, as near Cadiz. The whole number of known species is small.—When brought, as they frequently are, to Great Britain, they soon die, apparently from the coldness of the climate.

The fables which, in former times, were current regarding the C. were extremely numerous and ridiculous. It supplied not a few of those medicines to which absurd credulity ascribed the most marvellous powers.

CHA'MFERING. In Architecture, an angle which is slightly pared off, is said to be chamfered. The chamfer is sometimes made slighly concave, in which case it is called a *hollow* chamfer. Chamfers, in Gothic architecture, have frequently ornamental terminations of various kinds. The term C. is applied to wood-work as well as stone.

CHAMIER, Frederic, an English novelist, was born in London, 1796. He entered the navy as a midshipman in 1809, and distinguished himself in the American war. He left the service in 1833. The success of Marryat in depicting sea-life led C. to try the same field, in which he was not without success, though in invention and humor he falls short of his model. His best romances are—"Life of a Sailor" (3 vols., Lond. 1834), "Ben Brace" (3 vols., Lond. 1835), "The Arethusa" (3 vols., Lond. 1836), "Trevor Hastings" (3 vols., 1841), "Passion and Principle" (3 vols., 1843), "Tom Bowline" (3 vols., 1839), "Jack Adams" (3 vols. 1838), &c. All his novels have been translated into German. C. wrote a "Review of the French Revolution of 1848" (Lond. 1849), in which he gives a rather prejudiced view of some of the prominent actors. He died on the 1st of November 1870.

CHAMISSO, Adelbert Von, one of the most celebrated of German lyric poets, was born in 1781 at the castle of Boncourt, in Champagne. His parents settling in Prussia in 1790, he became a page of the queen and entered upon a military career. But when the campaign of 1806 broke out he returned to France, for though no admirer of Napoleon, he was unwilling to fight against his native land. At this time he was thrown into the circle of Madame de Staël at Coppet, and there began that study of natural philosopy which he afterwards pursued at Berlin. In 1814 Count Rumjanzow, chancellor of the Russian empire, prepared an exploring expedition round the world at his own expense; C. accompanied it as naturalist. He embarked at Cronstadt under Captain Otto von Kotzebue, chief of the expedition, which, however, failed in its main object—that of discovering a *northeast* passage. Subsequently he obtained a situation in the Botanical Garden of Berlin, was made a member of the Academy of Science, and after a happy domestic life, died there in 1838, universally loved and honored. He wrote several works on natural history, but his fame rests chiefly on his poetical productions. As early as 1804—1806, he, together with Varnhagen von Ense, published a "Musen Almanach." In 1813 he wrote his original and amusing fiction called "Peter Schlemihl," the story of the men who loses his shadow, which has been translated into almost all the languages of Europe. The character of his poetry is wild and gloomy, and he is fond of rugged and horrible subjects. In his political songs he succeeds well in humor and irony, nor is he deficient in deep and genuine feeling. Indeed, several of his ballads and romances are master pieces in their way. We may instance one of his longest poems, "Salas y Gomez," written in terza rima, as a proof how peculiarly German the cast of C.'s mind was, despite his French origin. His collected works, in six volumes, appeared at Leipsic in 1836—1839.

CHA'MOIS (*Antilope rupicapra*, Ger. *Gemse*), a species of antelope (q. v.), inhabiting the Alps and other high mountains of Central and Southern Europe, as the Pyrenees, the Carpathians, and the mountains of Greece; also those of some of the Mediterranean islands, Caucasus, Taurus, and other mountains of the west of Asia. It is one of the antelopes sometimes designated *capriform* or goatlike, because of their departure from the typical or true antelope form, and approach to that of the goats. The C. is about the size of a large goat, but the neck is longer in proportion, and the body shorter; the horns seldom more than six or seven inches

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long, black, rising nearly straight up from the forehead, and so bent back at the tip as to form a hook. The color is brown, deeper in winter than in in summer; the tail is black; the head is of a pale-yellow color, with a dark-brown band along each cheek.

The usual summer resort of the C. is in the higher regions of the mountains which it inhabits, not far from the snow-line, and it is often to be seen lying on the snow. In winter, it descends to the higher forests. The aromatic and bitter plants of the mountain-pastures are its favorite food. It is—like the ruminants generally—very fond of salt; "and many stones are met with in the Alps, hollowed out by the continual licking of the C., on account of the saltpetre with which they abound." It is gregarious: flocks of one hundred are sometimes seen; but in the Swiss Alps, where the numbers have been much reduced by hunting, the flocks are generally very small, and often consist only of a few individuals. Old males often live solitarily. The C. produces one or two young at a birth, in the month of March or April.

It is an animal of extraordinary agility, and flocks may often be observed sporting in a remarkable manner among the rocky heights. It can leap over ravines of 16 to 18 feet wide; a wall of 14 feet high presents no obstacle to it; and it passes readily up or down precipices which almost no other quadruped could attempt. It is said to descend obliquely almost perpendicular precipices of more than 90 feet, striking its feet once or twice against the rock, as if to stay and guide its descent, and alighting securely, often on a very narrow ridge of rock, with its hind feet first, and bringing the fore feet almost into contact with them.

Hunting of the C. is an occupation attended with great hardships and much danger, but of which, nevertheless, some of the Swiss peasants become passionately fond. The hunter sometimes goes out on the adventurous chase alone; but more frequently several go out together, dividing into parties; and whilst the flock of C. flee from those whose approach they first descry, an opportunity of using the rifle is obtained by their comrades. The scent of the C. it extremely keen; and when by this sense it is apprised of the approach of the hunter, it becomes alarmed and restless until it sees him, upon which it rushes hastily in an opposite direction, and so falls into the ambuscade. When a flock of C. is feeding, one is always on the watch, and by a sort of whistle, announces apprehended danger.—The flesh of the C. is highly esteemed. Its skin is made into leather, and from it the original *shammoy* or *shammy* leather, so much prized for softness and warmth, was obtained, although the name has now become common also to leather prepared from the skins of other animals. See LEATHER.—When taken young, the C. is easily tamed. The C. of the Persian mountains is smaller and of a paler color than the European variety, and its horns bend from the base.

CHA'MOMILE, or Ca'momile (*Anthemis*), a genus of plants of the natural order *Compositæ*, sub-order *Corymbiferæ*, distinguished by imbricated bracts, a scaly, conical receptacle, a ray of one row of female florets, those of the disk hermaphrodite, the achænia obscurely four-cornered, and destitute of pappus. The species are annual and perennial herbaceous plants, chiefly natives of Europe and other temperate parts of the world. Several are found in Britain, amongst which is the COMMON C. (*A. nobilis*), the most important species of the genus, well known for its medicinal virtues, a perennial plant with a stem about a foot long, procumbent and much branched, each branch terminated by a flower (head of flowers) more than an inch broad, with yellow disk and white ray, the whole plant intensely bitter and highly aromatic. Its medicinal virtues are ascribed to the essential oil which it contains, *Oil of Chamomile*, which abounds most of all in the involucre. This oil is of a greenish-yellow color, and is used in the preparation of some medicines. The dried flowers are often administered in the form of an infusion, as a stimulant of the nerves of the abdomen, an alterative and antispasmodic; or are applied to the skin as an anodyne, and on account of their power of promoting absorption and suppuration. The infusion also acts as an emetic, and is often used to assist the action of other emetics. C. flowers find a place in the pharmacopœia, and are also amongst the most esteemed of domestic medicines, the plant being extensively cultivated for their sake, and very generally finding a place even in cottage-gardens. Yet they ought to be used with caution, as they have been known to produce congestion in the brain, and are very apt to aggravate any malady of this kind already existing. A double-flowering variety

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of C. is more generally cultivated than the single, to supply the C. flowers of the shops, the flowers being whiter and more bulky, but it is otherwise rather inferior. C. is easily propagated by parting the roots. It delights in a dry and rather poor soil.—The name WILD C. is given to a very similar plant, also a native of Britain (*Matricaria Chamomilla*), an annual belonging to a genus closely allied to *Anthemis*. It may readily be distinguished by the want of scales on the receptacle. Its medicinal virtues resemble those of common C., and although now disused in Britain, it is in some parts of Europe preferred for internal use, because it is less bitter, less nauseous, and generally milder and more agreeable in its operation.—No small quantity of common C. is illegally used in the manufacture of beer in England, and is imported from Germany for this purpose. Yet this plant is so abundant in some parts of the south of England as to form a principal part of the pasture in sheep-walks, and to fill the whole air with its scent. The other British species of C. (*Anthemis*) are mere weeds; one of them, called Stinking C. (*A. Cotula*), is so acrid as to blister the fingers, if much handled. But the flowers of the OX-EYE C., or DYER'S C. (*A. tinctoria*), a native of many parts of the continent of Europe, yield a beautiful yellow dye, on account of which the plant is often cultivated.

CHAMOND, St., a town of France, in the department of Loire, situated at the confluence of the Gier and the Ban, about 7 miles north-east of St. Etienne, on the railway between that place and Lyon. It is a flourishing well-built town, with extensive manufactures of ribbons and stay-laces. C. has also several silk-mills and numerous iron furnaces and foundries; and extensive coal-mines exist in the vicinity. Pop. (1872) 12,382.

CHAMORERIL, a lake of Ladakh or Middle Tibet, in lat. 32° 55′ n., and long. 78° 15′ e. It lies at a height of 15,000 feet above the sea, on the plateau between the upper waters of the Sutlej and of the Indus, girt by mountains which rise, at some points, 5000 feet above its own level. Though it is beyond the recognised limits of perpetual congelation, yet it freezes only in winter, and is hence supposed to be of great depth. Necessarily receiving much water from the surrounding mountains, it is without any visible outlet—evaporation alone, even at this elevation, appearing to maintain one uniform surface on a length of 15 miles, and a width of 2½.

CHAMOUNI, or Chamonix (Lat. *Campus munitus*), is the name of a wild and romantic valley and village among the Alps in Savoy. It lies at a distance from all the high roads, at an elevation of about 3400 feet above the level of the sea, and more than 2000 feet above that of the Lake of Geneva. The valley is about 13 miles long, and about 2 broad, and is traversed by the Arve. It is bounded at the east end by the Col de Balme, over which there is a mule-path to Martigny, in the upper valley of the Rhone, and from the other end issues the road to Geneva, which lies at a distance of 53½ miles from Chamouni. On the north side lies Mont Breven and the chain of the Aiguilles Rouges, and on the south, the giant group of Mont Blanc, from which enormous glaciers or rivers of ice slide down, even in summer, almost to the bottom of the valley. The chief of these glaciers are—the Glacier des Bossons, des Bois, d'Argentière, and du Tour. By ascending to a point called Montanvert, we come upon the upper course of a glacier, where it expands into a great mountain-lake of ice called the Mer de Glace, in which there is a solitary rock or oasis called Le Jardin, about seven acres in extent, and covered with the most beautiful herbage. The excursion to the Jardin is one of the most striking excursions within the range of Chamouni. Until 1741, the valley was almost unknown; the region was considered a wilderness, and known by the name of Les Montagnes Maudites, or "accursed mountains." In the above year, it was visited by two Englishmen, Pocock and Wyndham, who ascended as far as Montanvert; and a granite block there still bears the name of the Englishmen's Stone. It was only, however, in 1775 that the attention of travellers was effectually called to it by Saussure and Bourrit. The valley is rich in peculiar plants, and furnishes an aromatic and perfectly white honey. The village of C. owes its origin to the Benedictine convent founded between 1088 and 1099. The population of the village is about 2400, who depend partly upon the strangers who visit the valley, and partly upon the pastures and upon hunting. There are several good hotels, and the best guides are to be found here for the neighboring Alps. It is from C. that Mount Blanc is usually ascended.

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CHA'MPAC (*Michelia Champaca*), an Indian tree, possessing great beauty both of foliage and flowers, and much venerated both by Brahmanists and Buddhists. Images of Buddha are made of its wood. Its flowers have a pale-yellow tint, and a sweet oppressive perfume, much celebrated in the poetry of the Hindus.

CHAMPAGNE, formerly a province of France, now forming the departments of Seine-et-Marne, Aube, Yonne, Haute-Saone, and Ardennes. The province was about 180 miles long by 150 broad, its surface presenting extensive plains with ranges of hills, especially in the north and east. Upon these hills is grown the famous Champagne wine.

In ancient times, C. was known as a part of Gallia, was subjugated by Cæsar, and afterwards was annexed to the kingdom established by the Franks. After the 11th c., it had its own dukes, who were vassals of the French kings. By the marriage of Philippe IV. with Joanna, heiress to the kingdom of Navarre, Champagne, and Brie, C., in 1284, came to the French crown, and was incorporated by Philippe VI. in 1328. During the campaign of 1792, the eastern part, and, in the campaign of 1814, the western part of C. was the chief arena of warfare.

CHAMPA'GNE WINE is the produce of vineyards in the above-mentioned province of Champagne. There are white and red Champagnes; the white is either sparkling or still. Sparkling or effervescent (*mousseux*) C, is the result of a peculiar treatment during fermentation. In December, the wine is racked off, and fined with isinglass, and in March it is bottled and tightly corked. The fermentation being incomplete when the wine is bottled, the carbonic acid gas generated in a confined space dissolves in the wine, and communicates the sparkling property to Champagne. To clear the wine of sediment, the bottles are first placed in a sloping position with the necks downward, so that the sediment may be deposited in the necks of the bottles. When this sediment has been poured off, some portion of a *liqueur* (a solution of sugar-candy in cognac) is added to the wine, and every bottle is filled up with bright clarified wine, and securely re-corked. The effervescence of the wine thus prepared bursts many bottles, in some cases 10 per cent.; and in seasons of early and sudden heat, as many as 20 and 25 per cent. have been burst. Wine-buyers estimate the value of wine according to the breakage, that which breaks most bottles being considered best. Still or non-effervescent C. is first racked off in the March after the vintage. Creaming or slightly effervescent C. (*demi-mousseux*) has more alcohol, but less carbonic acid gas than sparkling Champagne.

The best varieties of this wine are produced at Rheims and Epernay, and generally on a chalky soil. Among white Champagnes of the first class, the best are those of Sillery, which are of a fine amber hue, dry, spirituous and possessing a superior *bouquet*; those of Ay and Mareuil are less spirituous, but are sparkling, with a pleasant bouquet. Other white wines of first class are those of Hautvilliers, Dizy, Epernay, and Pierry.

In the first class of red C., or Montagne, we have the varieties of Verzy, Verzenay, Mailly, St Basle, Bouzy, and Thierry; all having fine color, clearness, good body, sufficient spirit, and a pleasant *bouquet*. The trade in Champagne wine is chiefly carried on in Rheims, Avise, Epernay, and Chalons-sur-Marne. The cellars in which the vintages are stored are cut out of the calcareous rock. The fact that the sale of C. is very extensive and lucrative, has naturally given rise to adulterations. Sugar, and the juices of pears or gooseberries, or birch-juice, &c., have been used for making spurious Champagne. It may fairly be reckoned that not even a third part of the wine sold for C. in Paris is genuine. The greater part of it is readily manufactured by simply charging other light wines with carbonic acid gas. Recently the German purveyors have succeeded in preparing light wines—such as Rhenish, Main, Necker, Meissner, and Naumburg—so much like genuine C., as to deceive even the connoisseur. Altogether it is estimated that the district produces 1,100,000 hectolitres (24,200,000 gallons) of genuine C., of which, however, the finest growths make but a small part.

CHA'MPARTY, or Cha'mperty (Fr., from Lat. *campi partitio*, a division of lands), an offence known to the law of England, which consists in a bargain between the plaintiff or defendant in a suit, and a third party, generally a lawyer, that the latter shall have part of the land, debt, or other thing sued for, in the event of suc-

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cess, and that in the meantime he shall carry on the suit at his own expense. This practice has been strictly forbidden by statute in England from very early times (3 Edward I., c. 25; 13 Edward I., c. 49; &c.); and in Scotland, the rule of the civil law by which the *pactum de quotâ litis* (q. v.) was held to be a *pactum illicitum* (q. v.), and as such void, has all along been part of the common law. Such practices were also forbidden by statute to members of the College of Justice (1594, c. 216). There is this difference between the laws of the two countries, however, that whereas in England the offence has always been punished criminally, in Scotland, the only penalty which it entails beyond nullity of the bargain, is deprivation of office. In former times, the evil chiefly apprehended from C. probably was, that the honesty of judges might be tampered with by advocates who were generally their friends, and not unfrequently their very near relatives, if permitted to be personally interested in the issue of the causes in which they were professionally employed. In our own day, the chief danger consists in the encouragement which might thus be given to dishonest and oppressive litigation, and the facilities which would be afforded for nefarious transactions between the agents on the opposite sides. That practices closely analogous to C., though unnamed, are not unknown in the lower strata of the legal profession in all countries, is but too probable. The necessities of trade have further introduced considerable equitable modifications into the law of C., which will be explained under CHOSE IN ACTION.

CHA'MPION (from a Gothic root signifying to contend, fight; Ang-Sax. *camp* fight). In the judicial combats of the middle ages, it was allowed to women, children, and aged persons, except in cases of high treason or of parricide, to appear in the lists by a representative. Such a hired combatant was called a champion. Those who followed this profession were generally of the lowest class, and were held disreputable; for besides the perils of the combat, they were liable to be executed as well as their clients. They were obliged to wear a peculiar dress of leather, and peculiar armor, which was also held disreputable. They were not allowed to fight on horseback, and appeared in the lists with their hair and nails cut short. Champions are mentioned as early as in the time of Charlemagne; and Otto I. employed them in deciding the succession to the empire. At a later period, in the age of Chivalry, the word C. came to have a more dignified acceptation, and signified a knight who entered the lists on behalf of an injured lady, of a child, or of any one incapable of self-defence. In England, the crown even had its C., who, mounted on horseback and armed to the teeth, challenged, at every coronation at Westminster, all who should deny the king to be the lawful sovereign of the three realms. This practice is understood to have been first introduced under Richard II., and it continues to make a part of the ceremonial of an English coronation to this day. The name of C. was also given to the knight who, during a tournament, had charge to see that no injury or insult should be offered to the assembled ladies.

CHAMPLAI'N, a lake separating the states of New York and Vermont, and penetrating, at its north end, about six miles into Lower Canada. It empties itself into the St Lawrence, about 45 miles below Montreal, by the Sorel or Richelieu. It is navigable throughout for vessels of about 100 tons, having its communications improved by one canal on its own river, and by another to the Hudson. It stretches in lat. from 43° 30′ to 45° 6′ n., and in long. from 73° 30′ w.; its extreme breadth, however, never exceeding 15 miles. Its principal towns are Whitehall at the south, Plattsburg on the west, and Burlington on the east. Both Lake C., and its tributary, Lake George, have been prominent in the history of the country—during the rivalry of France and England before the conquest of 1759—1760; during the revolutionary struggle of 1775—1782; and lastly, during the war of 1812—1814, between Great Britain and the United States.

CHAMPOLLION, Jean François, an illustrious name in modern Egyptian archæology, was born, December 23, 1790, at Figeac, in the department of Lot, France. In 1801, he was introduced to Baron Fourier, secretary to the *Institut d'Egypte*, who initiated him into the science of Egyptian antiquities. In 1807, C. went to Paris, in order to pursue, with more advantage, his oriental studies; and, in 1809, was appointed professor of history in the Lyceum of Grenoble. In 1811, he published his work, "L'Egypte sous les Pharaons," intended as the forerunner of a more elaborate work on Egypt, of which only the geographical section appeared, in 1814. In his en-

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deavor to decipher the Rosetta Stone, C. labored under the error of supposing that in this inscription the hieroglyphics were wholly ideographic, and the demotic and hieratic characters wholly phonetic. Afterwards, he was led to believe that the hieratic characters were of the same nature as the hieroglyphic, and this conviction he expressed in a communication made to the *Académie des Inscriptions*, in August 1831. In the same year he published his essay, "Sur l'Ecriture Hiératique des Anciens Egyptiens" (Grenoble), a work which is now scarce. In this essay he continued to assert the common ideographic nature of both hieroglyphic and hieratic characters. Meanwhile C. had been made acquainted with the conclusions of the acute mathematician, Dr Thomas Young (q. v.), respecting the phonetic use of hieroglyphic signs. Without doubt, it was this important discovery, of which Dr. Young, however, made no great use, that set C. on the right track of investigation, and led to those brilliant results which were regarded by Niebuhr as constituting the greatest discovery of the century. By a comparison of the name of Ptolemy on the Rosetta Stone with that of Cleopatra on the Philensian obelisk, he was enabled to lay the foundation of an alphabet, which he continued to elaborate until it now forms the basis of modern Egyptian archæology. His first decisive discoveries were made known in his celebrated "Lettre à Mons. Dacier" (Par. 1822), which was followed by the "Précis du Système Hiéroglyphique" (Paris, 1824; second ed. 1828;) but his principal work, "the Grammaire Egyptienne," was posthumously published in 1836.

In 1824, appeared his "Panthéon Egyptien;" and in 1825, his celebrated letters to the Duc de Blacas, in which he explains the names and titles of many of the Pharaohs, written on the monuments in Drovetti's Egyptian Collection at Turin, and attempts to class them into dynasties. His theory of *interpretation* was much controverted at first, but its importance was recognised by such distinguished scholars as Rossellini, Bunsen, Sir William Gell, and others.

In 1828 he was appointed by Charles X. to accompany a scientific expedition to Egypt, of which the results were given by Rossellini in the "Monumens de l'Egypte et de la Nubie" (Par. 1835—1845). On his return to Paris, 1830, C. was made a member of the *Académie des Inscriptions*, &c.; and, in the following year, was appointed to the new chair of Egyptian Antiquities in the College of France; but soon after the commencement of his intended course of lectures, in May 1831, he fell ill, and died, March 4, 1832. According to Silvestre de Sacy, "few men, since the birth of letters, have rendered to erudition services equal to those which have consecrated to immortality the name of Champollion."

CHAMPOLLION-FIGEAC, Jean Jacques, a distinguished French archæologist, was born, 1778, at Figeac, in the department of Lot. After holding in Grenoble the offices of librarian and professor of Greek literature, he was appointed, in 1828, conservator of MSS. in the Imperial Library in Paris; but, after the February revolution, was deposed from office by Carnot. In 1849, he was appointed by Louis Napoleon, librarian of the palace of Fountainebleau. Beside the "Antiquités de Grenoble" (1807), his chief works include the "Annales des Laigides and Egypte Ancienne" (forming a part of "L'Univers Pittoresque;") "Les Tournois du Rio René," a splendid work, with lithographs by Motte; and several publications of old French documents. After the death of his younger and more celebrated brother, C. was employed in editing the MSS. left by that distinguished scholar, and has given an account of them in "Notice sur les Manuscrits Autographes de Champollion le Jeune" (Par. 1842). He died May 1867.

His son, AIME-CHAMPOLLION-FIGEAC, follows the same path of historical antiquarianism, and has published several interesting and useful works.

CHANA'K-KALESSI' (Turkish "Pot-Castle"), a town of Anatolia, deriving its name from its manufactures of crockery, is situated on the Dardanelles, about 28 miles south-west of Gallipoli. Its castle is the most important on the Dardanelles, which name is sometimes given to the town itself. Pop. some 3000 or 4000.

CHANCE, in its original and strict meaning, may be defined as that which determines the course of events, in the absence of law, ordinary causation, or providence. Strictly speaking, it is an idea which few would now be disposed to admit as corresponding to anything which really exists; the religious mind excluding it as inconsistent with the belief in the Divine government, and the philosophical

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mind rejecting it as inconsistent with a recognition of universal laws of causation. As a word, however, it has always been, and always will be popularly accepted; and its use is correct so far as we overlook, or choose for the moment to throw out of view, the more universal connection of events, and regard them as their emergence, on a superficial view, appears to be determined. The idea of C., as referring to some apparently capricious or at least inexplicable cause of an event, distinguishes it from the word probability, or the degree with which the expectation of an event approves itself to a particular mind, the first expressing what metaphysicians would call an objective, and the second a subjective idea. It is clear that C., being only legitimate as an expression in popular parlance—or if admitted as a term in philosophy, one that would at once lead into the most inextricable problems—is a term which is much too definite to admit of any kind of measurement; while what we call probability, or the degree with which an expectation approves itself, owing to certain data presented to the mind, does, as we shall hereafter see, admit of a kind of measurement which leads to very important consequences. For these reasons, the consideration of what is sometimes called the *Doctrine of Chances*, but what is more properly the *Theory of Probabilities*, will be found under the head of PROBABILITY.

CHA'NCEL, (Fr.; Lat. *cancellus*, a screen). The C. was, and in some churches is still, separated from the nave by a screen of lattice-work, so as to prevent general access thereto, though not to interrupt either sight or sound. As it was in this part of the C. that the service was always performed previous to the Reformation, the clergy were held to have a special right to it, in return for which its repairs in general still fall on the impropriator, rector, or vicar, and not on the parish. The chief pew in the C. belongs to the rector or impropriator, but the disposal of the seats in the church, with this exception, belongs to the ordinary, or, practically, to the churchwardens, to whom the authority of the ordinary is delegated. No monument, moreover, can be set up without the ordinary's consent. The term C. is usually confined to parish churches which have no aisles around the choir, or chapels behind it or around it; and in this case the C. and the choir have the same signification. But in larger churches there are sometimes chancels at the ends of the side aisles, and this whether the choir has the character of a choir in the larger sense, or of a chancel. See CHURCH.

CHA'NCELLOR (Lat. *cancellarius*). It is said that the chief notary or scribe of the Roman emperor was called C., either because he was intrusted with the power of obliterating, *cancelling*, or *crossing out* (*cancellare*, to make lattice work) such expressions in the edicts of the prince as seemed to him to be at variance with the laws or otherwise erroneous; or because he sat *intra cancellos*, within the lattice-work or railings (*cancelli*) which were erected to protect the emperor from the crowding of the people when he sat in judgment. Neither the title nor the office of C. is at all peculiar to England. The C. of France (Chancelier de France), from a very early time was an officer of state of great power and dignity, under whom several other officers bearing also the title of C., were employed in the administration of justice and in the defence of the public order. The C. of France was the constitutional interpreter of the will of the sovereign, his functions being on the whole analogous to those exercised by the C. of England. As an instance in the change of the value of money, not more remarkable than many which could be cited in our own country, it may be mentioned that in 1290 the salary of this high official was six sous a day, with the privilege to him and his of eating at the court. When he was at Paris and ate at his own lodgings, he had twenty sous a day. The office was abolished at the Revolution, and though it was restored by the Bourbons, and even under the first Napoleon the higher-sounding title of Archi-chancellier was revived, many of the functions of the old C. were transferred to the minister of justice, and have ever since been held by him.

In most of the other countries of Europe there are officers of state who bear this, or analogous titles, though their powers and duties are very various. The chief functionary in the Austrian Empire has often been termed C.; and on the re-constitution of the German Empire, Prince Bismarck was made "C. of the Empire" (*Reichskanzler*). Besides these state-chancellors, there were officers in many other

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capacities to whom the title was given. Every bishop has his C. in the Church of Rome, and there are still Law C. of cathedrals, dioceses, universities, &c.

CHANCELLOR, Lord. It is usually said that the existence of the office in England, as in the other states of Europe, it is to be ascribed to the influence which the constitution of the Roman empire had on the constitutions of the modern nations. This influence was exercised in no small measure through the medium of the church, the profession of the law being generally exercised by ecclesiastics; and it is for this reason, probably, that the bishop and the king are furnished with officers bearing the same title, and exercising analogous functions. The C. is always the confidential adviser of the sovereign in state affairs. It is, for this reason that he has been called the keeper of his conscience, and that in England it is to him that the duty was intrusted of presiding over a court which acted on what were called—by way of contradistinction equitable considerations. It is in this latter prerogative that the chief distinction exists between the C. and all other judges; for, whilst they are held by the letter of the law, he was at one time supposed to act rather *juxta bonum et æquum*. In certain more special points of view, there is a similarity between the functions of the chancellors in different states. "In all of them he seems to have had the supervision of all charters, letters, and such other public instruments of the crown, as were authenticated in the most solemn manner; and therefore, when seals came into use, he had always the custody of the sovereign's great seal."—Stephen's "Commentaries," vol. iii. p. 398. It is from this last mentioned circumstance that the office of C., or Keeper (q. v.), which, by 5 Elizabeth, c. 18, is declared to be exactly the same, is created without writ or patent, by the mere delivery of the great seal, and that the C., if a baron, takes precedency of every temporal lord not a member of the royal family, and of all bishops except the Archbishop of Canterbury. The C. is a privy-councillor by his office, a member of the cabinet, and prolocutor, or speaker of the House of Lords, by prescription. Though the form in which his tenure of office is terminated, is by the resumption of the great seal by the sovereign, the C. practically resigns office with the party to which he is attached. He has the appointment of all justices of the peace throughout the kingdom, but this privilege he exercises generally on the recommendation of the lord-lieutenants. But the most important, and as it now seems, somewhat anomalous branch of his patronage, arises out of his having been originally an ecclesiastic. Though the last bishop who held the office was John Williams, Archbishop of York, who was Lord Keeper from July 10, 1621, to November 1, 1625 the C. still continues to be patron of all the crown livings of the value of £20 per annum, or under (though in 1863 about 300 were sold to augment the incomes of those sold and those retained), and a visitor of all hospitals and colleges of the king's foundation. As representing the paternal character of the sovereign, again, the C. is the general guardian of all infants, idiots, and lunatics, and has the supervision of all charitable uses in the kingdom. As regards his judicial patronage, the arrangement is, that the C. appoints in general all the judges of the superior courts, except the two chief-justices, who are nominated by the prime-minister of the day. Of inferior appointments, the latter also has reserved to him the commissioners of bankruptcy and the judges of the county courts. All these functions the C. performs in addition to his extensive duties as the supreme judge of the Court of Chancery, both as an ordinary court of common law and of record, and as an extraordinary court of equity. Much inconvenience had arisen from the accumulation of duties in the single person of this high dignitary, and various expedients had been devised for lessening the evil. Vice-chancellors had been appointed, and the duties of the Master of the Rolls had been extended. In 1875 a considerable change was made by consolidating all the Vice-chancellors' Courts into one division, called the Chancery Division of the High Court. And the C.'s duties in the House of Lords as the highest appeal court were lightened in 1876. The proposal of a minister of justice has, however, not yet found favor. The Salary of the C. is £10,000 a year, and he has an annuity of £5000 on his retirement from office. The style of the C., since the union with Scotland, has been Lord High Chancellor of Great Britain, but he has scarcely any jurisdiction in Scotland, and in Ireland there is a separate C., having powers in most respects the same as those of the C. of Great Britain. To slay the C. is treason under 25 Edward III. c. 2.

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CHANCELLOR OF A CATHEDRAL is an officer who superintends the arrangements for the celebration of the religious services. His office is quite distinct from that of the

CHANCELLOR OF A DIOCESE, who, as vicar-general to the bishop, is an ecclesiastical judge, appointed to assist the bishop in questions of ecclesiastical law, and hold his courts for him. By 37 Hen. VIII. c. 17, it is provided that the C. of a diocese may be a layman, whether married or single, provided he be doctor of the civil law, lawfully create and made in some university. By the canons of 1603, he must be a bachelor of law, at the least, or a master of arts. There are certain cases, however, in which the bishop must sit in person. In case of complaint against a clerk in holy orders, for any ecclesiastical offence against the Church Discipline Act (3 and 4 Vict. c. 86), the bishop is to hear the cause, assisted by three assessors: of whom the dean of his cathedral, or one of his archdeacons, or his chancellor, must be one; and a serjeant-at-law, or advocate who has practiced 5 years in the court of the archbishop of the province, or barrister of 7 years' standing, another.

CHANCELLOR OF A UNIVERSITY. The highest honorary office connected with a university is generally that of chancellor. See UNIVERSITY.

CHANCELLOR OF SCOTLAND. Previous to the union of the two kingdoms in 1707, when the office was abolished, the C. of S. performed functions in many respects analogous to those which belong to the Lord High Chancellor of Great Britain. He presided in parliament, and was the head of all the courts of judicature; he was the chief counsellor of the king, and keeper of the great seal. From the fact of the distinction between law and equity in the English sense never having been recognised in Scotland, the C. had no judicial functions separate from those of the ordinary courts of law, but he had the principal direction of the Chancery, the constitution of which is described below. In early times, the C. of S., as of England, was very frequently an ecclesiastic; but the first, Constantine, Earl of Fife, in the reign of Alexander I., and the last, the Earl of Seafield, who held the office at the Union, were both laymen; and many other nobles, Earls of Argyle, Angus, Huntly, &c., appear in the lists given in Crawford's "Officers of State," and Chalmers's "Caledonia." On the abolition of the office, a Keeper of the Great Seal was appointed, who acts merely ministerially in affixing it to the writs which pass under it. See GREAT SEAL.

CHANCELLOR OF THE EXCHEQUER. See EXCHEQUER.

CHANCE-MEDLEY, and Chand Medley, or Mellé (Fr. *chaud*, hot; and *mêlée*, a fray), as it is called in Scotland, are French expressions borrowed by our law. Though often spoken of as synonymous, they are, in reality, distinct in meaning—the one signifying a casual affray; the other, an affray in the heat of blood or passion. Both are in this country, and in most others, recognised as pleas in mitigation of the offence of *homicide* (q. v.). See also SANCTUARY.

CHANCERY (Lat. *cancellaria*). As the Roman emperors, and after them the various sovereigns who divided the vast inheritance of the empire, had each a Chancellor (q. v.), so in every European kingdom there was an establishment called a C., where these officers performed their functions. If we imagine a large chamber divided by lattice-work (*cancelli*), the outer half devoted to the people, the inner occupied by the chancellor and his subordinates, engaged in framing edicts, letters of nobility, and the like, and engrossing them on parchment, and sealing them with the king's own seal in proof of their authenticity, and then handing them through the railings to the people without, we shall have a pretty good conception of the C. in its earliest form.

In France, as there were subordinate chancellors attached to the parliaments of the respective province, so there were subordinate chanceries; but the grand C. of France, which followed the person of the king, was alone, in strictness, entitled to the name.

The apostolic C. at Rome, in which, in addition to the documents pertaining to his temporal sovereignty, the bulls and briefs of the pope are authenticated, is presided over by a cardinal, with the title of Vice-chancellor.

CHANCERY, or Cha'ncellary, of Scotland, of the public office in the General Register House, at Edinburgh, managed by the director of C. and his deputes, in

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which all charters, patents of dignities, gifts of offices, remissions, legitimations, presentations, commissions, brieves, retours, and other writs appointed to pass the great and quarter seals, are recorded. See GREAT SEAL.

CHANCERY, Court of, in England. Besides the functions pertaining to the chancellor in other countries, the Chancellor of England had early assigned to him the office of a judge; and the English C. consequently became a court of law, the peculiar character of which will be rendered intelligible by the following considerations: In assigning judicial functions to the chancellor's department, it was not intended that it should interfere with that other department of government which has everywhere been distinguished both from the legislative and the executive—viz., the judicial. But in all departments, according to the imperial theory from which the idea of the C. at least was derived, the sovereign was supreme, and to his will, or to his sense of justice, there was consequently an appeal in judicial, as in other matters. His chancellor, however, was his advisor in all matters whatsoever; and thus, though not a judge in the strictest sense, it is manifest that his counsel, in judicial matters of the highest importance, would constantly be called in. But further, the king governed by laws, even before he was governed by them; and for the sake of order and his own convenience, he would naturally add to or supplement the law which he had established, only where it could be shewn to him that it did not meet the substantial justice of the particular case. He would consequently be a judge, not of the interpretation or application of the law, which he would leave to his ordinary judges, but of its adequacy to circumstances which had changed, or had not been anticipated; and when he interfered, it would be to some extent in the character of a legislator, as well as of a judge. The king would thus be a judge in equity, in the popular and intelligible sense of that word; and acting in this capacity himself, it would be in this capacity that he would call in the aid of his chancellor. It is not mysterious, then, how in early times the Court of C. came to be a court of equity; and the chief difficulty regarding its origin seems to attach to the other of the two great departments into which it is divided, and in which it exercises jurisdiction as a court of common law. But as the free constitution of England developed itself, it soon became apparent that equity, in the old despotic or patriarchal sense—in which it was not so much the administration as the making or modifying of law—was inconsistent with its principles, whether it proceeded from a judge or from the monarch himself. The popular sense of equity was consequently abandoned; and a technical sense, unknown to the jurisprudence of every other nation, was given to it. The proceedings of the Court of C. "on its equity side," which had hitherto been a mere supplement to law, came now to be hedged in by rules and precedents as closely as those of any court of common law. What henceforth continued to be the distinction *in principle* between law and equity, or between the functions of the courts of common law and the Court of C., or even of the two great departments of this court itself, it is perhaps impossible to state. The arbitrary line which has been drawn between the class of cases assigned to the one set of courts and to the other, will be considered under EQUITY.

The judicial duties of the chancellor have long been shared by the Master of the Rolls, an officer of high rank, who was originally appointed only for the superintendence of the writs and records appertaining to the common-law departments of the court, but who was accustomed also to sit as a separate though subordinate judge on the equity side. The disputes which had arisen regarding his powers were set at rest by 8 Geo. II. c. 30, which declares that all orders made by him, except such as by the course of the court are appropriated to the great seal alone, shall be valid, subject nevertheless to be discharged or altered by the Lord Chancellor, and so as that they shall not be enrolled till they are signed by his lordship. By 3 and 4 Will. IV. c. 94, the master's powers are further increased, and he may now hear motions, pleas, and demurrers, as well as causes generally. The salary of the Master of the Rolls (q. v.) is £6,000 a year. The vast increase of business, and the still greater increase of arrears, during the previous half-century, rendered it necessary, in 1813 (53 Geo. III., c. 24), to appoint another assistant to the chancellor, under the title of the Vice-chancellor of England; and in 1841, when the equity business of the Exchequer was transferred to the C., two more vice-chancellors were added. Each of these judges sits separately from the Lord Chancellor, and their functions extend to both departments of the court. Their salaries are £5,000 a year. Another

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important addition (14 and 15 Vict. c. 83) was that of the lords justices of the Court of Appeal for all courts. This court consisted of the Lord Chancellor, together with these judges; but the lords justices, when sitting without the chancellor, possess the same jurisdition which belongs to him, and their existence does not prejudice his right to sit alone. The lords justices possess the same authority in matters of lunacy as the chancellor; and they, sitting together, constitute, without the chancellor, the Court of Appeal in Bankruptcy. An appeal, which may also be entertained by the Lord Chancellor sitting alone, lies to this court from all the separate courts of the Chancery Division; and from this appellate jurisdiction there is an appeal in turn to the House of Lords. The lords justices may also take up original causes, though these, in practice, are mainly confined to the Divisional Courts of the High Court. Till recently, certain parts of the equitable jurisdiction of the Court of C. were confided to the Masters in Ordinary (see MASTERS IN CHANCERY) and the Accountant-general. The office of the masters has been abolished, but that of the accountant continues to be one of the most important connected with the court. Besides these more important officers, the Court of C. has always had a large body of subordinates, registrars, taxing-masters, and a staff of record and writ clerks attached to it.

The subdivision of courts into those of equity and common law had long been found mischievous, inasmuch as it in some cases doubled the expense to the suitor, by sending him from one court to another for instalments of the justice which he sought. For many years this anomalous arrangement had been given up as indefensible, and bills from time to time were introduced into parliament in order to rearrange the courts so as to administer entire justice in every case. Great changes were necessary in this department of the law, and the only question was at last reduced to the best mode of settling the details of the High Court of Justice, which was to supersede the previously existing courts. For the changes ultimately carried through under the Judicature Acts of 1873–1876, and the constitution of the new High Court of Justice, see COMMON LAWS. The C. Court is now the Chancery Division of the re-constituted High Court.

In various colonies of the British empire local courts have been established in imitation of the High Court of C., an institution which, from its cumbrous, anomalous and unscientific character, scarcely merited imitation; but in America, though the distinction between law and equity was at first adopted and long adhered to with the tenacity with which Englishmen cling to their native customs, it has been abolished in the state of New York, and law and equity there, as elsewhere in the world, now constitute one system, administered in one series of tribunals of original and appellate jurisdiction. On the continent, the English Court of C. has always been a subject of ridicule; and a recent French writer, in speaking of it, says: "Nothing ever comes to an end in it; and the unhappy man who has a process there, can be sure of but one thing—viz., that whether he gains it or loses it, his ruin is certain." The acts by which evils which were inseparable from the constitution of the Court of C.—and which spring from the distinction between law and equity, on which its very existence depended—had been mitigated, were the following: 15 and 16 Vict. cc. 80, 86, and 87, 21 and 22 Vict. c. 27, 23 and 24 Vict. cc. 38, 128, 25 and 26 Vict. c. 2.

CHANCRE. See SYPHILIS.

CHA'NDAH, a town of India, on the south-west frontier of the territory of Nagpore, on the left bank of the river Eraee, near its junction with the Wurda, 90 miles south of the town of Nagpore. Its walls, built of cut stone, and surrounded by a high parapet, are six miles round, from 15 to 20 feet high, and flanked with round towers large enough for the heaviest guns. Within the place, and almost equi-distant from the north and south faces, is a citadel; the rest of the interior consists of straggling streets, detached houses, and plantations. It is well supplied with water. In 1818, C. was taken by the British. Pop. 16,283. C. is capital of a British administrative district having an area of 9700 square miles, and a pop. of 534,431.

CHANDERNAGO'RE, a French city, with a scanty territory of about 2000 acres, on the right or west bank of the Hoogly, 21 miles above Calcutta by railway, on the opposite shore, in lat. 22° 50′ n., and long. 88° 23′ e. The population, estimated at

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about 30,000, consists of a few Europeans and Eurasians (q. v.), and the rest natives of unmixed blood. Independently of political considerations, the place has, through the gradual silting up of the river, lost some of its commercial advantages. Within 100 years back, ships of the line ascended to C.; now, however, vessels even of far inferior burden, seldom get above Diamond Harbor, which is nearly 50 miles further down. C. was established in 1676, and for awhile rivalled Calcutta. It was captured by Clive in 1757, but finally restored to the French in 1816.

CHANDHAIREE', or Chanderi, a town of Gwalior, India, in a hilly and jungly district, near a tributary of the Jumna. It is at present much decayed, on account of Mahratta oppression, the scourge of war, and the decay of its manufactures, which are undersold by the cheaper fabrics of Britain; but the extent and architectural excellence of its ruins indicate its splendor and importance in former times, when it is said to have contained 14,000 stone houses, 384 markets, 360 caravanserais, and 12,000 mosques. The fort of C., formerly deemed impregnable, consists of a strong rampart of sandstone, flanked by circular towers, and is situated on a high hill. Among other remains of former greatness, is a pass cut through a solid rock 100 feet high. During the native wars, being a place of importance, C. was frequently besieged. Under Mahratta sway, it became a haunt of freebooters, very troublesome to the native districts under British rule or protection; and on the conclusion of the treaty of 1844, it was, among other lands, assigned for the maintenance of the increased Gwalior contingent, commanded by British officers.

CHANDLER, Dr. Richard, a scholar and antiquary of considerable eminence of the last century, was born at Elson, in Hampshire, in 1738, and educated at Oxford. He first became known as the editor of the magnificent work, "Marmora Oxoniensia," published by the Oxford University in 1763. He afterwards travelled through Greece and Asia Minor, with Revett, an architect, and Pars, a painter, at the instance of the then flourishing Dilettanti Society, with a view to collect information regarding the former state of these countries, and to procure exact descriptions of the ruins. The result of their united labors appeared in 1769, in 2 vols., entitled "Ionian Antiquities." C. also published a valuable account of the ancient inscriptions of Asia Minor and Greece; and his account of his travels in these countries, issued in 1775—1776, is still a standard work. He also published a "History of Troy." He died in February 1810.

CHANDO'RE, a town and fort in the district of Nassick (q. v.,) presidency of Bombay, its lat. and long. being 20° 20′ n. and 74° 14′ e. C. is a flourishing place, with a population of (1872) 5662. The fort which commands an important pass on the route between Candeish and Bombay, is situated on the summit of a hill naturally inaccessible everywhere but at the gateway. It surrendered to the British in 1804; and being subsequently restored to Holkar, was finally ceded by him in 1818.

CHA'NDOS CLAUSE. During the discussion of the clauses of the Reform Bill (q. v.) in 1831, the Marquis of Chandos (Tory), afterwards Duke of Buckingham, proposed the insertion of a clause giving the county franchise to *tenants at will* occupying lands for which they paid an annual rent of £50. This was opposed by the ministers on the ground that the class proposed to be enfranchised would be subject to the coercion of the landowners, who would thus virtually determine the elections. The amendment, however, was supported by many of the Radicals, who at that time regarded any extension of the suffrage as a boon, and was carried by a majority of 84. The clause was incorporated in the bill of the following year, and was finally carried by a majority of 372 to 32. The result proved a material accession to the Conservative element in counties. Under the Reform Act of 1867, occupants of lands of a rateable value of £12 are entitled to the county franchise.

CHANDPOO'R, a town of British India, in the North-west Provinces, district of Bijnour, about 930 miles north-west of Calcutta, and 80 north-east of Delhi. It is of considerable size, and has a pop. (1872) of 12,033.

CHA'NFRON. See CHANGER.

CHANGARNIER, Nicolas Anne Théodule, a French general was born at Autun in 1793—and received his education at the military school of Saint-Cyr. In 1830, he

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went as lieutenant to Algeria, where he distinguished himself, and rose to the rank of general of division. After the proclamation of the Republic in 1848, he was appointed governor-general of Algeria, in the room of Cavaignac; but being chosen a member of the National Assembly, he returned to Paris, when he was appointed commander-in-chief of the garrisons of Paris and of the National Guard. He held this double office till the middle of May 1849, and again for some time after the insurrectionary movements of June of that year. C. was a member of the Legislative Assembly, where he held a sort of neutral position between the Orleanists and Legitimists, and opposed to the Bonapartists. At the *coup d'état* in December 1851, after being imprisoned in Ham, he went into exile till the Franco-Prussian war, when he offered his services to Napoleon III. He was in Metz with Bazaine; and, on its capitulation, retired to Brussels. He returned to France in 1871, entered the Assembly, and assisted M. Thiers in reorganising the army. He died in February 1877.

CHANG-CHOW-FOO, or Chaou-chow, a city of China, and capital of a department of the same name, in the province of Keang-su, in 31° 50′ n. lat., and 3° 24′ long. e. of Pekin.

CHANG-CHOW-FOO, a city of China, and capital of a department of the same name in the province of Fuh-keen, in 24° 31′ n. lat., and 1° 24′ long. e. of Pekin.

CHA'NGELING. It was at one time a common superstition, that infants were taken from their cradles by fairies, who left instead their own weakly and starveling elves. The children so left were called *changelings*, and were known by their peevishness, and their backwardness in walking and speaking. As it was supposed that the fairies had no power to change children that had been christened, infants were carefully watched until such time as that ceremony had been performed. This superstition is alluded to by Shakspeare, Spenser, and other poets; and it has not yet quite died out of some of the rural districts in Britain.

CHANG-SHA-FOO, a city of China, capital of the province of Hoo-nan, in 28° 20′ n. lat.

CHANK-SHELL, the popular name of the shell of several species of *Turbinella*, a genus of gasteropodous molluscs of the group *Siphonostomata* (q. v.), natives of the East Indian seas. These shells are obtained chiefly on the coasts of the south of India and Ceylon, and form a considerable article of trade to Calcutta. They are much used as ornaments by Hindu women, the arms and legs being encircled with them; and many of them are buried with the bodies of opulent persons. Those which are thrown up on the beach, after the death of the mollusc, and have become whitened, are little valued, but fresh shells readily find purchasers. The commercial returns shew an exportation of chank-shells from Madras amounting to the number of 2,460,727 in one year, 1853—1854, the value of which was about £10,000. The quantity ordinarily exported is smaller. A chank-shell opening to the right is rare, and is highly prized in Calcutta, so that a price of £50, or even £100, is sometimes paid for one.

CHA'NNEL, English—the *Mare Britannicum* of the ancients—is that arm of the Atlantic Ocean which divides England from France, gradually narrowing to the Strait of Dover. It is often called simply the Channel; and the fleet stationed in it for the protection of the English coast, the Channel fleet. The greatest river which falls into it is the Seine. It forms bays both on the English and on the French coast; but the larger ones are those on the French coast, whilst the best harbors are on the English.

CHANNEL ISLANDS, a group of islands belonging to Great Britain, lying off the north-west coast of France, between Normandy and Brittany. They are about 120 miles south-west of Southampton, and the nearest distance from the French coast is about 10 miles. The C. I. are the only parts of the dukedom of Normandy now belonging to the English crown, to which they have been attached since the Conquest. King John, about the year 1200, lost all Normandy except these isles. The chief islands of the group are Jersey, Guernsey, Alderney, and Sark. The area of the whole is 118 square miles, and the population in 1871 was 90,596. They are more particularly described under JERSEY.

CHANNING, William Ellery, D. D., a celebrated Unitarian preacher and author,

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was born 7th April, 1780, at Newport, Rhode Island, in the United States, entered Harvard University at the age of 14, and took his degree in 1798. In 1803 he was ordained minister of a church in Boston. During the earlier years of his ministry, his theological peculiarities had little prominence in his discourses, and in consequence he stood upon friendly terms with his brethren in more orthodox churches. In 1819, however, he preached a sermon at the ordination of the Rev. Jared Sparks, in which he advocated the Unitarian doctrine with so much zeal and ability, that he was termed the "Apostle of Unitarianism." This involved him in controversy, a thing which he naturally loathed. Nevertheless, to the end of his life, he preserved a devoutly Christian heart, shrinking with the delicate instinct of a pious nature from everything cold, one-sided, and dogmatic, whether Unitarian or Trinitarian. As late as 1841, he wrote: "I am little of a Unitarian, have little sympathy with the system of Priestley and Belsham, and stand aloof from all but those who strive and pray for clearer light." In 1821, he received the title of D.D., from Harvard University, on account of the high talent he had exhibited in his tractate on the Evidences of Christianity, his Address on War, and his Sermons. In 1822, he visited Europe, and made the acquaintance of several great English authors, such as Wordsworth and Coleridge, both of whom were strongly impressed in his favor. Coleridge said of him: "He has the love of wisdom and the wisdom of love." In 1823, he published an "Essay on National Literature;" in 1826, "Remarks on the Character and Writings of John Milton;" in 1829, the "Character and Writings of Fénelon;" in 1835, a work in opposition to "Negro Slavery;" and in 1838, an essay on "Self-culture." Besides these, he wrote a variety of other essays and treatises, all characterised by vigor, eloquence, pure taste, and a lofty tone of moral earnestness. He died October 2, 1842, at Bennington, Vermont. An interesting memoir of him has been published by his nephew, William Henry Channing (3 vols., London, 1848).

CHANTILLY, a town of France, in the department of Oise, about 28 miles north-north-east of Paris. Being one of the most beautiful places in the vicinity of the metropolis, it attracts thence immense numbers of visitors. Apart from its natural beauty, it is interesting as the place where the great Condé spent the latter years of his life in the society of such men as Boileau, Racine, and Bossuet. The magnificent château in which he resided was pulled down at the revolution of 1793; but a lesser château, one of the finest specimens of the renaissance in France, still remains. The park and grounds are very charming. C. is also noted for its extensive manufacture of the *blonde* lace. Pop. (1872) 3884.

CHANTREY, Sir Francis, an eminent English sculptor, was born at Jordanthorpe, in Derbyshire, on 7th April 1781, not 1782, as has been generally said. His father, who was a carpenter, and rented a small farm, died when C. was only 12 years of age, leaving his mother in narrow circumstances. It is said that she gave him "as liberal an education as her limited means would admit;" but much cannot be meant by the phrase, if it be true, as asserted by Holland in his "Memorials," that his attendance at the little lane-side school was very irregular, and that "for a while he certainly drove an ass daily, with milk-barrels, between Norton and Sheffield." C.'s mother married a second time, and the boy was, in 1797, apprenticed for 7 years to a carver and gilder in Sheffield called Ramsay. It was in this humble department that C. acquired the rudiments of his future art. It was during this period that his first attempts at modelling in clay were made, and that by the help of casts taken from the faces of his fellow-apprentices and his own, he began the work of portraiture, in which his great eminence ultimately consisted. C.'s apprenticeship was cancelled two years before its expiry; but his subsequent career is not very accurately known. It is certain that he visited both London and Dublin in 1802, probably in the capacity of a journeyman carver and gilder; and in that year he seems to have received instruction as a pupil of the Royal Academy. It was probably then that he commenced seriously to prepare himself for the work of his future life. In the earlier part of his career as an artist, C. is said to have been under great obligations to Nollekens, who had the shrewdness to see, and the generosity to see without envy, his great promise in the branch in which he himself was eminent. In 1816, C. was elected an Associate, and in 1818 a Member of the Royal Academy; and in 1819 he visited Italy for the first time. Like the lives of many other eminent men, that of

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C. presents few claims on our interest after his early struggles were ended. As an ideal artist, he never attained a high rank, and, in comparison with Flaxman, he possessed little reputation in this country and none abroad. But he executed, with much truth to nature, as it presented itself to his eye, an endless variety and almost countless number of works of individual portraiture, so that there is scarcely any town of importance in Great Britain which cannot shew specimens of his skill. As a result of his diligence in this department of art, C. accumulated a very considerable fortune, the greater part of which, after providing for his widow, he bequeathed for artistic purposes. In this respect, he formed a remarkable contrast to Flaxman, whose modest savings were sworn under £4000; whilst Nollekens, whose name is almost forgotten, realized the enormous sum of £150,000, it is even said £200,000. C. died childless on the 25th November 1841, and was buried in a tomb prepared by himself at Norton. Lady C. died in January 1875, and the interest of her husband's gift to the Royal Academy, amounting to about £3000 a year, is now at the disposal of the Council, for the "promotion of British art."

CHA'NTRY (Fr. *chantererie*, from *chanter*, to sing). The term C. is applied alike to endowments or benefices, to provide for the chanting of masses, and to the chapels in which the chanting takes place. These endowments were commonly made in the form of testamentary bequests, the object being to insure the erection of a chapel near, or over the spot where the testator was buried, and to remunerate the priests for saying masses in it for the benefit of his soul, or of the souls of others named in his will. Many such chantry chapels are still to be seen in English parish churches; but they were more common in abbeys and monastic establishments, in which it was considered a privilege to be buried, and where some such offering to the brotherhood was in a measure the price of sepulture. These chapels, which have generally the tomb of the founder in the middle of them, are separated from the aisles or nave of the church by open screen-work, a circumstance which has sometimes led to their being called Chancels (q. v.). Sometimes, again, they are separate erections, projecting from the church externally; but in cathedrals and the larger churches they are generally constructed within the church, often between the piers. Many chantries are lavishly enriched with sculpture and tracery of all descriptions, and some of them are adorned with gilding and painting.

CHA'OS signified, in the ancient cosmogonies, that vacant infinite space out of which sprang all things that exist. Some poets make it the single original source of all; others mention along with it Gæa, Tartaros, and Eros. By some also only the rough outlines of heaven and earth were supposed to have proceeded from C., while the organisation and perfecting of all things was the work of Eros. Still later cosmogonists, such as Ovid, represent it as that confused, shapeless mass out of which the universe was formed into a *kosmos*, or harmonious order. Hesiod makes C. the mother of Erebus and Nox.

CHAOS, or Bird Islands, is the name given to several rocky islets situated at the entrance of Algoa Bay, South Africa, about 35 miles east of Port Elizabeth. It was on one of these islands that Bartholomew Diaz, the navigator, died in 1500.

CHA'OU-CHOW-FOO, a city of China, and capital of a department of the same name, in the province of Kwang-tung, in 23° 36′ 6″ n. lat., and 0° 46′ 40″ long. w. of Pekin.

CHAOU-KING-FOO, a city and capital of a department of the same name, in the province of Kwang-tung, 50 miles west of Canton, in 23° 4′ 48″ n. lat., and 4° 24′ 30″ long. w. of Pekin.

CHAP BOOKS, the name given to a variety of old and scarce tracts of a homely kind, which at one time formed the only popular literature. In the trade of the bookseller, they are distinguishable from the ordinary products of the press by their inferior paper and typography, and are reputed to have been sold by chapmen (see CHAPMAN) or peddlers; hence their designation. The older C. B. issued in the early part of the 17th c. are printed in black letter, and are in the form of small volumes. Those of a later date are in the type now in use, but are equally plain in appearance. Of either variety, they were mostly printed in London; many being without dates. They were of a miscellaneous kind, including theological tracts, lives of heroes, martyrs, and wonderful personages, interpretations of dreams, fortune-tell

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ing, prognostications of the weather, stories of giants, ghosts, hobgoblins, and witches, histories in verse, and songs and ballads. See "Notices of Fugitive Tracts and Chap Books," also "Descriptive Notices of Popular English Histories;" both by J. O. Halliwell, printed for the Percy Society. An inferior class of tracts succeeded these books for the common people, and are best known as "Penny Chap Books." For the most part they consisted of a single sheet duodecimo, or 24 pages. Besides the title, the first page usually contained a coarse wood-cut embellishment. The paper was of the coarsest kind adapted for printing, and the price, as the name imports, was a penny each. The subjects, besides being of a similar nature to the above, included stories of roguery and broad humor. These penny C. B. were issued by an obscure class of publishers in London and several English provincial towns, of which we might particularise Newcastle-on-Tyne. They were also issued from the presses of Edinburgh, Glasgow, Falkirk, and Paisley. It is a curious fact, that nearly all the penny C. B. of this very homely kind which were latterly popular, were written by Dougald Graham, who, previous to his death in 1779, filled the office of bellman or town-crier of Glasgow. The most reputable production of this humble genius was a "History of the Rebellion" in a Hudibrastic metre, which was a great favorite with Sir Walter Scott, and is now scarce; see "Chambers's Journal," First Series, vol. x. p. 84; also the "Paisley Magazine" (1829), an extinct publication of great rarity, in which is given a biographic sketch of Dougald Graham, with a list of his productions. In some parts of Scotland and the north of England, Graham's penny C. B. are still seen on stalls at markets; but the general advances in taste, along with the diffusion of an improved literature, have displaced them in almost all other quarters. Collections of the older C. B. are now found only in the libraries of bibliomaniacs, by whom they have been picked up at extravagant prices from dealers in second-hand books. In various continental countries there are numerous varieties of C. B. at exceedingly small prices. The French government being desirous to substitute a wholesome class of tracts of this kind for what are generally objectionable on the score of taste and morality, have latterly, through commissioners, taken some steps on the subject. See "Histoire des Livres Populaires, ou de la Littérature du Colportage," by M. Nizard. W. C.

CHAPA'LA, the largest lake in Mexico, containing about 1800 square miles. It is about lat. 20° 20′ n., and ranges in w. long. from 102° to 103° 25′. It is merely an expansion of the Rio Grande de Lerma, which enters the Pacific at San Blax. C. lies on the table-land of Anahuac, and has many islands.

CHA'PEL (Fr. *chapelle*), a word derived from *capa*, which originally signified a case, or chest in which were contained the relics of a saint, and afterwards the place where the chest was kept. The term now signifies a building erected for the purposes of public worship, but not possessing the full privileges and characteristics of a church. In this sense, all places of worship erected by dissenters are now called chapels in England, and the term is also applied to supplementary places of worship, even though in connection with the established church—such as parochial chapels, chapels of ease, free chapels, and the like. In former times, it was applied either to a domestic oratory, or to a place of worship erected by a private individual, or a body corporate. In the latter sense, we speak of chapels in universities and colleges. But its earliest signification was that of a separate erection, either within or attached to a large church or cathedral, separately dedicated, and devoted to special services See CHANTRY. Chapels had no burying-ground attached to them, and the sacrament of baptism was not usually administered in them.

CHAPELLE, La, the name of several places in France, the most important of which forms a northern suburb of Paris. Chemicals, salt, starch, liqueurs, &c., are manufactured.

CHAPELLE DE FER. See HELMET.

CHA'PERON, a hood or cap worn by knights of the Garter. Such a hood was at one time in general use, but was latterly appropriated to doctors and licentiates in colleges. A person who acts as a guide and protector to a lady at public places, is called a C., probably from this particular piece of dress having been used on such

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occasions. The name was also applied to devices which were placed on the heads of horses at pompous funerals.

CHA'PLAIN was originally the title of the ecclesiastic who accompanied an army, and carried the relics of the patron saint. See CHAPEL. It has now come to signify a clergyman not having charge of a parish, but employed to officiate at court, in the household of a nobleman, or in an army, garrison, ship, &c. Such officials began early to be appointed in the palace of the Byzantine emperors. The practice afterwards extended to the western empire, and to the courts of petty princes and even of knights, and continued to subsist after the Reformation. Forty-eight clergymen of the Church of England hold office as chaplains of the Queen in England, four of whom are in attendance each month. Six clergymen of the Church of Scotland have a similar title in Scotland; but their only duty is to conduct prayer at the elections of Scottish representative peers. A statute of Henry VIII. limits the right of nominating private chaplains in England: thus, an archbishop may have eight, a duke six, a baron three; and chaplains so appointed have certain privileges, and may hold two benefices with cure of souls.

AN ARMY CHAPLAIN is a clergyman whose services are retained especially by the government for the soldiery of the army. There have been such chaplains for many generations, and the office was at one time regarded as a saleable perquisite; but the system was reorganised and improved in 1796. In recent years Roman Catholic and Presbyterian chaplains have also been appointed, a practice which indicates the progress of toleration. The chaplains belong, not to *regiments*, but to the staff of the army, so as to be generally available. At home, they are attached to the military stations; but in the field they are located at headquarters, at the hospitals, and with the divisions. The officers at the stations usually arrange for the men to attend divine service at the nearest parish church; but this still leaves the chaplains many duties to fulfil. Where, as sometimes happens, there is no regular church or chapel near at hand, the C. reads and preaches to as many men as can conveniently group themselves around him at one time, and thus serves many different congregations at different times of the Sunday. He visits the sick at the hospitals, and examines and encourages the regimental schools. Among the wooden huts at Aldershott Camp, a church has been built, which is rendered available for chaplains of different religious denominations in succession.

When the system of army-chaplains was remodelled in 1796, a *chaplain-general* was appointed; this office was abolished by the Duke of Wellington soon after the termination of the great war, but revived by Mr Sidney Herbert in 1846. The C.-general, who receives £1000 per annum, has duties partaking somewhat of those of an arch-deacon. He assists the War Office in selecting chaplains, and in regulating the religious matters of the army, so far as Church of England matters are concerned. His office forms one of the 8 departments under the new organization of the War Office. There are 78 chaplains on the staff, besides officiating clergymen (not belonging to the army), and chapel-clerks. The commissioned chaplains receive from 10*s.* to 22*s.* 6*d.* per day, besides allowances; and there are always some on half-pay; while the officiating clergymen receive head-money for the troops attending their ministrations. The whole expenditure for chaplains, and other charges connected with divine service, figures in the Army estimates at near £50,000 annually.

NAVY CHAPLAIN. Every ship in commission, down to, and including fifth-rates, has a chaplain. The Navy Estimates provide for above 80 commissioned chaplains, at stipends varying from £219 to £401 per annum. The chaplains perform divine service at stated times on shipboard, visit the sick sailors, and assist in maintaining moral discipline among the crew.

CHA'PLET, a garland or head-band of leaves and flowers. In heraldry, a C. is always composed of four roses, the other parts being leaves.

CHA'PMAN, a trader, but popularly applied in a more limited sense to a dealer in small articles, who travels as a pedler or attends markets. C. is from *chap*, equivalent to *cheap*, a word which in its origin signified, a market or place for trading: hence *Cheapside*, *Eastcheap*. See CHAP BOOKS.

CHAPMAN, George, dramatist and translator was born in 1557, educated at Cambridge and Oxford, and was the contemporary and friend of Spenser, Jonson, and Shakspeare. His first play, entitled "The blind beggar of Alexandria," was

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printed in 1598. Up to 1630, he supplied the theatre with tragedies and comedies, and some of these, after the fashion of the time, were written in conjunction with other dramatists. As a writer for the stage, C. does not rank high. Despite many nervous passages, his plays want the irradiation of a constant genious, and his characters are unnatural. His translation of Homer is the most vigorous that has yet been executed in England, and in reading it, many have felt with Keats—

Like some watcher of the skies
When a new planet swims into his ken.

C. seems to have led a long, temperate, and happy life, unblasted by poetic fire. He died in 1634. Swinburne, the poet, published an edition of C.'s works, with a critical introduction, in 1875.

CHAPPED HANDS and Chilblains, a lesser and a greater form of disease of the skin, produced by undue exposure to extremes of cold and heat, and affecting chiefly the most exposed joints, the skin over which swells and cracks, with itching, pain, and heat; in the most severe cases there is ulceration, which is difficult to heal in proportion to the length of time the disease has been neglected. Chilblains may generally be avoided if the hands are washed always with tepid water, and not habitually exposed to great cold, or when cold, to the heat of a fire. When formed, they may be treated with oxide of zinc ointment; or with a dilute solution of borax in glycerine and water; or with glycerine alone, slightly diluted with water; the hands being in any case habitually covered with woollen gloves in cold weather.

CHA PTER-HOUSE (Fr. *chapitre*), the building in which the monks and canons of monastic establishments, and the dean and prebendaries of cathedral and collegiate churches, meet for the management of the affairs of their order or society. See CATHEDRAL. Chapter-houses frequently exhibit the most elaborate architectural adornment, as, for example, those at York, Southwell, and Wells. The original stained-glass windows remain at York, and are of exquisite beauty. On the walls of that at Westminster, the original painting has been discovered. Chapter-houses are of various forms: those at York and Westminster are octagonal; those at Oxford, Exeter, Canterbury, Gloucester, &c. are parallelograms; Lichfield is an oblong octagon; Lincoln, a decagon; and Worcester, a circle. They are always contiguous to the church, and are generally placed to the west of the transepts. They generally either open into the church, or are entered by a passage. Chapter-houses were often used as places of sepulture, and have sometimes crypts under them, as at Wells and Westminster.

CHARA'CEÆ, aquatic plants, forming, according to some botanists, a distinct natural order of acotyledonous plants; according to others, a sub-order of *Algæ*. Their stems are tubular, consisting either of a single tube, or of parallel tubes, a central one with smaller ones applied to its surface; they are either pellucid or incrusted with carbonate of lime, which is not to be regarded as a mere accidental incrustation, but belongs to their proper structure; and they have whorls of symmetrical tubular branches. They grow in stagnant waters, both fresh and salt, are always submersed, and often completely conceal muddy bottoms. A number of species are natives of Britain, all belonging to the genus *Chara*. The organs of reproduction are of two kinds—lateral *globules*, and axillary *nucules*. These organs have caused no little difficulty to botanists; the nature and use of the globules in particular being by no means well understood. The simple cellular structure of the C., apart from all consideration of their reproductive organs, associates them with the lower Algæ, rather than with phanerogamous plants. None of them is of any known use. It was in the C. that the beautiful phenomena of *Cyclosis* (q. v.) were first observed. Sir David Brewster discovered that each of the minute calcareous particles incrusting the C. possesses double refraction, and has regular neutral and depolarising axes.

Fossil Characeæ.—The calcareous incrustation which covers the organs of reproduction, as well as the stems of some C., has, from its power of resisting decomposition, caused the abundant preservation of this order in the Tertiary fresh-water strata. The nucules originally described under the name of *gyrogonites*, and supposed to be foraminiferous shells, have been noticed by E. Forbes in strata as old as the Middle Purbeck beds. No remains of these have been observed in newer

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deposits, until we find them in the Tertiaries. The nucules, associated with *Lymnæa* and *Planorbis*, are very abundant in the Eocene Bembridge beds (q. v.).

CHARACI'NIDÆ. See SALMONIDÆ.

CHA'RACTER (Gr. *charasso* or *charatto*, which signifies to scrape, cut, or engrave), means what is engraven on an object, either physically by the action of another external object or objects, or morally by the passions, the affections, by good or evil fortune, and by what we designate generally as "circumstances." In art, the expression of C., either in animate or inanimate objects, is, after correct delineation, the most important matter to be attended to. Though, properly speaking, all distinguishing marks are included under it, it is more generally used to designate those which mark individual from individual, than species from species, or genus from genus.

CHARACTER TO SERVANT. The master is under no legal obligation, either in England or in Scotland, to give a character to his servant, however long, faithfully, or efficiently he may have served him; the duty of bearing testimony in his favor being one which, however binding in morality, it has not been found convenient to enforce by positive law; but, if given, the character must be strictly true, or, at all events, in accordance with the master's belief, otherwise he may be exposed to an action of damages, either by the servant whom he has calumniated, or by a subsequent employer, whom he has deceived. If true, however, the fact of its being prejudicial will expose the master to no risk. In order to justify the giving of a bad character, however, it must, in general, be asked for by the servant, as the master is not entitled needlessly to publish the servant's defects. In that case, it will lie with the servant to prove its falsehood, not with the master to prove its truth. The case of the servant being known by the master to have committed a felony while in his service, is, however, an exception to this rule, as, in a case so extreme, the master is at liberty to warn others against taking him into their employment. Even though strictly true, the character, if prejudicial, must not be more so than the circumstances render necessary. Acts of petty dishonesty, such as are too common amongst servants, will not warrant the master in branding him as a thief. The safe course, in such a case, is to state the offence, and not to describe it by a general epithet, which may convey an erroneous impression of its magnitude.

It is probable that, partly from thoughtless good-nature, and partly from a selfish desire to get rid of a bad servant in the most comfortable manner, false characters are given in favor of servants very much more frequently than to their prejudice. It is desirable that masters and mistresses should have in view that they may render themselves liable in reparation of any damage which can be shewn to be the direct result of thus inflicting on a stranger a wrong which is unquestionably within the reach of the law.

By 32 George III, c. 56, personating a master, and thus giving a false character to a servant, or asserting in writing that a servant has been hired for a period of time, or in a station, &c., contrary to truth; and any person offering himself as a servant, pretending to have served where he has not served, or producing a false certificate, or altering a certificate, or pretending not to have been in any former service, &c., are offences at common law, punishable on conviction before two justices with a fine of £20. This statute does not extend to Scotland.

CHARACTERI'STIC. See LOGARITHMS.

CHARA'DE, or "syllable-puzzle" as the Germans call it, is an amusement which consists in dividing a word of one or more syllables into its component syllables, or into its component letters, predicating something of each; and then, having reunited the whole, and predicated something of that also, the reader or listener is asked to guess the word. As a specimen of the C. depending upon syllables, we adduce the following:

"My *first* is ploughed for various reasons, and grain is frequently buried in it to little purpose. My *second* is neither riches nor honors, yet the former would generally be given for it, and the latter are often tasteless without it. My *whole* applies equally to spring, summer, autumn, and winter; and both fish and flesh, praise and censure, mirth and melancholy, are the better for being in it. Ans. *Sea-son.*"

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As a specimen of the second class of charades, we take the following nappy example from the French:

"Quatre membres font tout mon bien,
Mon dernier vaut mon tout, et mon tout ne vaut rien."

The word is *zero*. It is composed of four letters, of which the last—viz., *o*, is equal to *zero;* the whole, zero itself, being equal to nothing.

But besides charades of this nature, there is another kind rather popular at evening parties—the *acted* C.: the character of which is entirely dramatic. Half a dozen or so of the company retire to a private apartment, and there agree to select a certain word, as the subject of the C.; let us suppose INNKEEPER. The next thing done is to take the first syllable, INN, and arrange a little scene and dialogue, each member taking a certain part. This being accomplished, the amateur actors return to the drawing-room, and commence their performance, the rest of the company constituting the spectators. Care is taken to mention conspicuously, and yet not obtrusively, in the course of the dialogue, the word INN, which is the subject of the scene. On its conclusion, they again retire, and devise a new series of incidents for the word KEEPER, generally something in connection with a menagerie or a madhouse. This being also represented, they retire for a third time, to contrive the final scene, into which both words, or rather the whole word, Innkeeper, must be dexterously introduced at an odd moment when the spectators are thought to be off the scent. The company are then asked to guess the word. In order to the effective performance of a C. of this sort, the actors must possess a good share of inventiveness, self-possession, and ready talk, as the greater portion of the dialogue has to be extemporised.

CHARADRI'ADÆ, a large family of birds, of the order *Grallatores*, and tribe *Pressirostres*, chiefly abounding in the temperate parts of the Old World, and generally frequenting sandy unsheltered shores and open moors and downs. They have a short bill, generally soft at the base, hard and often a little inflated towards the tip; long and powerful wings; long legs; and short toes, generally only three in number, and all directed forward, but sometimes they have also a very small hinder toe. They run with great swiftness; they generally congregate in flocks, at least during certain parts of the year; many of them are nocturnal in their habits; many are migratory. The Plovers (*Charadrius*) have given their name to the family, which includes also Lapwings, Pratincoles, Oyster-catchers, Turnstones, Sanderlings, &c.

CHARBON ROUGE, or Red Charcoal, is a variety of charcoal obtained by subjecting wood to the action of heated air from furnaces, or of steam, which has been raised to a temperature of 572° F. Air-dried wood, by the ordinary process of charring, yields at the best 21 to 26 per cent. of black charcoal; but when acted on by heated air or steam, as mentioned above, 36 or 42 per cent. of C. R. is obtained. It is now prepared largely in France and Belgium, and is used in stoves for heating, and in the preparation of gunpowder. It has a dark-red color, and consists of about 75 per cent. pure carbon, and 25 per cent. hydrogen and oxygen.

CHA'RCOAL is a popular term applied to charred wood, or coal produced by charring wood. There are several other varieties of C. however, for which see CARBON, ANIMAL CHARCOAL, WOOD CHARCOAL, COKE, BLACK-LEAD, &c.

CHARCOAL BLACKS are made both from animal and vegetable substances—e. g., burnt ivory, bones, vine-twigs, peach-stones, nut and other shells, the smoke of rosin condensed, &c. Those which are derived from vegetable substances, when mixed with white, are usually of a blue tint. See LAMP-BLACK.

CHARENTE, a considerable river in the west of France, rises in the department of Haute-Vienne, about 14 miles north-west of Chalus. It first flows north-west to Civray, where it turns southward into the department of Charente to Angoulême, thence it flows westward past Châteauneuf, Jarnac and Cognac, and entering Charente-Inférieure, it runs north-west past Saintes, and falls into the Atlantic below Rochefort, and opposite the islands Oléron and Aix. This river gives its name to two departments, both remarkable for the productiveness of their vineyards; but the wines are mostly used in the preparation of brandy and liqueurs.

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CHARENTE, a department of France, formed chiefly out of the old province of Angoumois, and situated in lat. 45° 10′—46° 8′ n., and long. 0° 50′ e. and 0° 30′ w. Area, about 2200 square miles. Pop. (1872) 367,520. It is generally hilly, and is watered by the river Charente, above noticed, and its tributaries, the Tardouère and the Bandiat, with the rivers Vienne and Dronne. The highest chain of hills in the north of C. is a continuation of the heights of Limousin, forming the watershed towards the Loire. Remains of marine productions shew that the basin of the C. was once filled by the ocean. The soil is mostly limestone, here and there interrupted by banks of clay and gravel. Only a portion of the arrondissement Confolens has a rich vegetable clay-mould. The clay soil is cool and moist, while the limestone district is dry and hot. The hills are in many places clad with chestnut forests. The climate is generally mild and healthy. The wines grown are spirituous and fiery in flavor, and are chiefly used in the manufacture of Cognac, which forms the most important of the exports. Truffles grow abundantly in several parts. Industry is in rather a backward condition. C. is divided into the five arrondissements of Angoulême, Cognac, Ruffec, Barbezieux, and Confolens.

CHARENTE-INFÉRIURE, a maritime department of France, which includes the former province of Angoumois, with the greater part of Saintonge, and a small portion of Poitou. It lies in lat. 45° 5′—46° 19′ n., and long. 0° 7′ e—1° 18′ w. The Bay of Biscay washes its western boundary—the coast-line, which is very broken, measuring about 100 miles. Area, 2740 sq. m. Pop. (1872) 465,653. It is watered on its boundaries by the Sèvre-Niortaise and the Gironde, and in the centre by the navigable Charente and the coast-stream Seudre. The surface is level; and the soil—near the coast, intersected by ridges of rock and sand-banks, and protected from the sea by dikes—is mostly chalky and sandy, but very fertile, producing hemp, flax, saffron, and wine in great quantities. The commerce, facilitated by the structure of the coast, and by canals in the interior, is considerable, consisting chiefly of brandy and sea-salt, which is found in the department in great abundance. The oyster and pilchard fisheries are important. The chief harbors are those of Rochefort, and La Rochelle, the latter of which is the chief town. C. is divided into the six arrondissements of La Rochelle, Rochefort, Marennes, Saintes, Jonzac, and St Jean-d'Angely.

CHARENTON-LE-PONT, a town of France, in the department of Seine, situated on the right bank of the Marne, 5 miles south-east of Paris. The bridge over the river, which is important from a military point of view, being considered one of the keys of the capital, and which has frequently been the scene of conflicts, is defended by two forts, forming a part of the fortifications of Paris. At the other side of the river is the National Lunatic Asylum, formerly called Charenton St Maurice, and now St Maurice simply. Pop. (1872) 6090.

CHARGE, in Heraldry. The figures represented on a shield are called charges, and a shield with figures upon it is said to be charged (Fr. *chargé*). The charges in a shield ought to be few in number, and strongly marked, both as regards their character and the mode of their representation. The family shield, belonging to the head of the house, almost always is simpler, i. e., has fewer charges than the shields of collaterals, or even of junior members.

CHARGE, in Military Warfare, is a sudden and impetuous attack on the enemy, by horse or foot, or both. Its object usually to drive the enemy from a particular position; but if made with a much stronger force, it may result in his actual destruction.

CHARGE, in Military Pyrotechny, is sufficient combustible material for one firing or discharge. It is applicable to all kinds of firings, fireworks, and explosions; but the name is generally given to the quantity of gunpowder requisite for firing off a gun, &c. In cannon, this varies greatly, from $\frac{1}{2}$ to $\frac{1}{16}$ of the weight of the shot; some of the rifled ordnance now coming into use are remarkable for the smallness of the C. with which they are fired. The quota of C will be mentioned in connection with the various kinds of firearms described in the "Encyclopædia." In breaching a wall, a greater C. is necessary than in attacking a ship or a column of troops, even with the same kind of gun and projectile.

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CHARGE. In the law of Scotland, a C. is a command to perform an act, conveyed in the letters of the sovereign. The same term is applied to a messenger's copy for service, requiring the person to obey the order contained in the letters—e. g., a C. on letters of horning, or a C. against a superior.

CHARGER is a name sometimes given to a war-horse, accustomed to the din of battles, and reliable under circumstances of confusion and danger. In the middle ages, when armor was used, and gun-powder unknown, the military horses were *barbed* or *barded* when ridden by men-at-arms—that is, they were nearly covered with armor. The face, the head, and the ears were covered with a mask called a *chanfron*, to prevent fright when charging the enemy; and an iron spike projected from the middle of the forehead. The neck was defended by small plates called *crinieres*; the breast by a *poitrinal*; and the buttocks and haunches by *croupières*. These various pieces of armor were mostly made of metal, but sometimes of tough leather. The horse was occasionally covered with chain-mail; and in other instances with a *gambeson* of stuffed and quilted cloth. The man-at-arms generally rode another horse when not charging, to relieve the C. from his great burden. The barbed or *bardé* horse received its name from an old French word implying covered, clothed, or armed. A war horse is still called a C., though not armed as in ancient times.

CHARGÉS D'AFFAIRES are fourth-class diplomatic agents, accredited, not to the sovereign, but to the department for foreign affairs; they also hold their credentials only from the minister, and are sometimes only empowered by an ambassador to act in his absence.

CHA'RIOT, in ancient times, was a kind of carriage used either for pleasure or in war. According to the Greeks, it was invented by Minerva; while Virgil ascribes the honor to Erichthonius, a mythical king of Athens, who is said to have appeared at the Panathenaic festival founded by him, in a car drawn by four horses. The ancient C. had only two wheels, which revolved upon the axle, as in modern carriages. The pole was fixed at its lower extremity to the axle, and at the other end was attached to the yoke, either by a pin or by ropes. The Greeks and Romans seem never to have used more than one pole, but the Lydians had carriages with two or three. In general, the C. was drawn by two horses. Such was the Roman *Biga* (q. v.), but we also read of a *triga*, or three-horse C., and a *quadriga*, or four-horse one. The last was that in which the Roman generals rode during their triumphal entrance into the city, and was often adorned with splendid art. The war-C. held two persons—the soldier himself and the driver, the latter of whom usually occupied the front; but the chariots used by the Romans in their public games held only the charioteer.

The oldest war-chariots of which we read are those of Pharaoh (Exodus xiv. 7). All the eastern nations used them, while we learn from Cæsar ("De Bell. Gall.," v. 19) that the Britons also were familiar with their use.

CHA'RITABLE USES and Law of Charities. The law of England has always anxiously, though too often ineffectually, sought to provide for the preservation and proper application of the public and private endowments in that country for charitable purposes. The preceding efforts of the legislature in this direction may now be said to have been superseded by the Charitable Trusts Acts (16 and 17 Vict. c. 137, 18 and 19 Vict. c. 124, 23 and 24 Vict. c. 136, and 32 and 33 Vict. c. 110). See CHARITY COMMISSIONERS. As these statutes now contain a species of code of charity-law, it will here only be necessary to mention certain general principles which govern the law of England in its relation to charities. The courts of equity are those which in general take cognizance of all charitable uses, or trusts of a public description. Under the authority of these tribunals—or, in cases in which the annual income does not exceed £50, in accordance with the act just quoted, under that of the county courts of the district—trustees may be called to account for the funds committed to their charge, or new trustees may be appointed, improvident alienations may be rescinded, schemes for carrying the donor's object into effect may be judicially considered and adopted, and every species of relief afforded which such institutions require. Where the management of the charity has been confided by the donor to governors and others functionaries, the law will not interfere with their proceedings unless they can be

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shewn to be squandering the revenues or otherwise abusing the trust. Where the crown is founder, the Lord Chancellor is visitor, but in his personal character only, and not as judge of the Court of Chancery. As regards the nature of the trusts to which the equitable jurisdiction of the Chancery extends, it is necessary to remark that the word *charitable* here includes institutions for the advancement of learning, science, and art, and, indeed, for all useful public purposes, as well as for the support of the poor. It also comprises all donations for pious and religious objects, under which are included all those which tend to the benefit of the Church of England, or of any body of dissenters sanctioned by law. Roman Catholics were admitted into this category by 2 and 3 Will. c. 115, and Jews by 9 and 10 Vict. c. 50, s. 2. The charity, or other benevolent purpose, however, must be public; "for if a sum of money be bequeathed, with direction to apply it to such purposes of benevolence and liberality as the executor shall approve," or even "in private charity," the law will take no notice of such a trust.

Legacies to pious or charitable uses are not by the law of England entitled to a preference, though such was the doctrine of the civilians; but where a deficiency of assets arises, they are abated in proportion with the others.

CHA'RITY, Sisters of. See SISTERS OF CHARITY.

CHARITY COMMI'SSIONERS. A body of commissioners was created in 1853, by the Charitable Trusts Act, 16 and 17 Vict. c. 137 (see CHARITABLE USES), with power to inquire into all charities in England and Wales, with reference to their nature, objects, and administration, and the amount and condition of the property belonging to them. The commissioners have power to call for the production of accounts and documents from trustees, and to appoint inspectors to visit and report on their management. The statute does not extend to Scotland or Ireland, to the English universities, or to the city of London. An annual report of their proceedings must be laid before parliament by the commissioners.

CHARIVARI is a French term used to designate a wild tumult and uproar, produced by the beating of pans, kettles, and dishes, mingled with whistling, bawling, groans and hisses, and got up for the purpose of expressing a general dislike to the person against whom it is directed. The etymology of C. is obscure; The Germans translate it by *Katzenmusik*, the English of which is *caterwauling*. In France, during the middle ages, a C. was generally raised against persons contracting second nuptials, in which case the widow was especially assailed. On these occasions, the participators in it, who were masked, accompanied their hubbub by the singing of satirical and indecent verses, and would not cease till the wedding couple had purchased their peace by ransom. C. answers to the English concert upon "marrow-bones and cleavers," with which it was customary to attack a married couple who lived in notorious discord. It was also got up against an unequal match, such as where there was great disparity in age between the bride and bridegroom.

Similar customs seem to have existed under different names in all parts of Europe, and sometimes they were of such a licentious and violent character as to require military interference to put them down. Even as early as the 14th c., the church found itself forced to threaten punishment, and even excommunication, against those who participated in them. In more recent times, the C. has taken a purely political coloring; as, for example, during the Restoration in France, at which time, however, the popular voice began to seek vent by casting its satirical darts against public men through the press. The papers published for this purpose were called C., the most famous among which is *the* CHARIVARI, which was established in Paris, December 2, 1832, corresponding to the English publication, "Punch" (q. v.).

CHARKO'V. See KHARKOV.

CHA'RLATAN, a mountebank, quack-doctor, or empiric, and hence any one who makes loud pretensions to knowledge or skill that he does not possess. The word seems to be derived from the Ital. *ciarlare*, to babble or talk, the chief art of the C. consisting in talk. Charlatanism abounds in all departments of life, and manifests itself in various ways according to the subject and character of the person. It changes also in form with the spirit of the time. The medical C. no longer appears on a stage in the guise of Doctor Ironbeard, but as a fine-dressed gentleman, receiving grateful acknowledgments through the newspapers, and publishing popular

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medical books, with the address of the author, and recommendations to apply to him. It has not unfrequently happened, however, that extraordinary men who were so far before their age as not to be understood by it, such as Paracelsus, have passed for charlatans until more justly estimated by later times. Several books have been written on the charlatanism of scholars. J. B. Mencke's satire, "De Charlataneria Eruditorum" (Leip. 1715), is a classical work, which has been continued by Büschel in his book, "Ueber die Charlatanerie der Gelehrten seit Mencke."

CHARLEMAGNE, i. e., Charles the Great, king of the Franks (768—814 A.D.), and Roman emperor (800—814 A.D.), was born on 2d April 742, probably at Aix-la-Chapelle, and was the son of Pepin the Short, the first Carlovingian (q. v.) king of the Franks, and grandson of Charles Martel (q. v.). On Pepin's death in 768, he and his brother Carloman jointly succeeded to the throne. By Carloman's death, and the exclusion of both his sons from the throne, C. became sole king. In 772, it was resolved in the Diet at Worms to make war against the Saxons, for the security of the frontiers, which they continually threatened, and for the extension of the Christian religion. C. advanced as far as the Weser in 772, securing his conquests by castles and garisons. Pope Adrian I. now called him to his aid against Desiderius, king of the Lombards. C. had married the daughter of Desiderius, and had sent her back to her father because she bore him no children, and married Hildegarde, daughter of the Swabian duke. Godfrey. Desiderius had sought revenge by urging the pope to crown the two sons of Carloman, and on the pope's refusal, had laid waste the papal territory. C. crossed the Alps from Geneva, with two armies, by the great St Bernard and Mont Cenis, in 773, and overthrew the kingdom of the Lombards in 774. The Lombard dukes acknowledged him as their king, and he secured the pope's favor by confirming the gift which Pepin had made to the papal see, of the exarchate of Ravenna. In 775, he was again employed in the most northerly part of his dominions, reducing the Saxons to subjection; in 776, he suppressed an insurrection in Italy; in 777, he so completed his victory over the Saxons, that their nobles generally acknowledged him as their sovereign in an assembly at Paderborn. Being now invited to interpose in the wars of the Arabs and Moors in Spain, he hastened to that country in 778, and added to his dominions the regions between the Pyrenees and the Ebro. From Spain he was summoned in haste by a new insurrection of part of the Saxons, who had advanced almost to Cologne, but whom he drove back to the Elbe. In 781, he went to Italy, where the pope crowned his second son, Pepin, king of Italy, and his third son, Louis, an infant of three years old, king of Aquitaine. The Saxons once more rising in arms, defeated and destroyed a Frankish army on the Süntel in 782, which C., after a new victory, fearfully revenged by causing no fewer than 4500 prisoners to be executed as rebels in one day. A more general rising of the Saxons followed, but in 783—785, the Frankish monarch succeeded in reducing them completely to subjection, and in persuading their principal chiefs to submit to baptism, and to become his faithful vassals. Subsequent insurrections and wars in Germany, between this year and 800, resulted in victories over the Bulgarians and Huns, and in the further consolidation and extension of his empire, the eastern boundary of which now reached to the Raab.

In 800, C. undertook an Italian campaign, which was attended with the most important consequences. Its immediate purpose was to support Pope Leo III. against the rebellious Romans. When C., on Christmas Day, 800, was worshipping in St Peter's Church, the pope unexpectedly, as it appeared, set a crown upon his head, and, amidst the acclamations of the people, saluted him as Carolus Augustus, emperor of the Romans. Although this added nothing directly to his power, yet it greatly confirmed and increased the respect entertained for him, such was still the lustre of a title with which were associated recollections of all the greatness of the Roman empire. A scheme for the union of the newly revived Western Empire with the Empire of the East, by C.'s marriage with Irene (q. v.), the Byzantine empress, failed by reason of Irene's overthrow. After this, C. still extended and confirmed his conquests both in Spain and in Germany. He labored to bring the Saxons to a general reception of Christianity, and founded bishoprics for this purpose. To the end of his reign, he was incessantly engaged in wars, and insurrections were always apt to break out in the frontier parts of his dominions;

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which he endeavored to secure, however, not only by military power and arrangements, but by improvements in political and social institutions. His views were liberal and enlightened to a degree rare for many subsequent ages. Whilst he made the power of the central government to be felt to the utmost extremities of his empire, he recognised in his subjects civil rights, and a limitation of monarchic power by their assemblies. He zealously endeavored to promote education, agriculture, arts, manufactures, and commerce. He projected great national works, one of which was a canal to connect the Rhine and the Danube; but he deemed nothing beneath his attention which concerned the interests of his empire or of his subjects. He required his subjects to plant certain kinds of fruit-trees, the cultivation of which was thus extended northward in Europe. His own domains were an example of superior cultivation. He had a school in his palace for the sons of his servants. He built sumptuous palaces, particularly at his favorite residences, Aix-le-Chapelle and Ingelheim—for he had no fixed capital—and many churches. Learned men were encouraged to come to his court. He himself possessed an amount of learning unusual in his age; he could speak Latin and read Greek. He attempted to draw up a grammar of his own language. C. was of more than ordinary stature, and of a noble and commanding appearance. He was fond of manly exercises, particularly of hunting. He was too amorous, but in eating and drinking he was very moderate. His fame spread to all parts of the world; in 768, Harun-al-Raschid sent ambassadors to salute him. He enjoyed good health till shortly before his death, 28th January 814. He was buried at Aix-la-Chapelle (q. v.), in a church which he had built there. He was succeeded by his son Louis, styled Louis le Débonnaire, the only one of his sons who survived him; but the greatness of his dynasty terminated with his own life. C. is styled Charles I. in the enumeration both of the French kings and of the German or Roman emperors. Besides his *capitularies* (q. v.), there are extant letters and Latin poems ascribed to him. His life was written by his secretary, Eginhard.

CHARLEROI, a Belgian town and fortress in the province of Hainaut, stands on the Sambre, between Mons and Namur, on the line of the Brussels and Namur Railway. The pop. is (1873), 12,150, who carry on considerable manufactures in hardware, glass, woollen-yarn, &c. The district is rich in coal, and the number of smelting-furnaces and nail-factories in the neighborhood is very great. The iron-works of Couillet, which yield a third of all the cast iron produced in Belgium, lie within a mile or two of the town. C. possesses considerable historical and political interest as a fortress. The fortifications were begun by the Spaniards in 1666, but falling into the hands of the French next year, they were completed by Vauban. After six exchanges of masters between the French and Spaniards, the peace of Aix-la-Chapelle, 1748, left C. in the possession of Austria. In 1794, after a protracted and desperate resistance, it was surrendered to the French by capitulation, when the fortifications were demolished. The importance of the place in a strategic point of view having become apparent during the campaign of 1815, the fortifications have been since restored.

CHARLES, surnamed Martel—i. e., the Hammer—was the son of Pepin of Heristal, mayor of the palace under the last Merovingian kings, and was born about 690 A.D. After his father's death in 714, he was proclaimed mayor of the palace by the Austrasian party. King Chilperic and he now quarrelled, and a civil war arose, which ended in C. becoming undisputed mayor of the palace and ruler of the Franks. During the latter years of his life, he indeed allowed the nominal throne to remain occupied—the titular kings being mere puppets in his hands. He was much engaged in wars against the revolted Alemanni and Bavarians, the Saxons, &c., but his importance as a historic personage is chiefly due to his wars against the Saracens, who, having conquered Septimania from the Western Goths in 720, advanced thence into Aquitaine, conquered Bordeaux, defeated the Duke of Aquitaine, crossed the Garonne, advanced to the Loire, and threatened Tours. C. defeated them between Tours and Poitiers in 732, in a great battle in which their leader, Abdur-Rahman, fell, and a stop was put to their progress in Europe, which had filled all Christendom with alarm. He defeated them again in again in 738, when they had advanced in the Burgundian territories as far as Lyon; deprived them of Languedoc, which he added to the kingdom of the Franks; and left them nothing of their possessions north of the Pyrenees beyond the river Aude. He died on 22d October

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741, at Quiercy on the Oise, in the midst of his victories, his projects, and his greatness, leaving the government of the kingdom to be divided between his two sons—Carloman, and Pepin the Short.

CHARLES, Archduke of Austria, third son of the Emperor Leopold II., was born at Florence, 5th September 1771. Whilst yet a youth, he pursued military studies with much ardor; and after having greatly distinguished himself as a general in inferior commands, he was intrusted, in 1796, with the chief command of the Austrian army on the Rhine. He fought with great success against Moreau at Rastadt, defeated Jourdan in several battles, drove the French over the Rhine, and concluded his victories by taking Kehl in the winter. In 1799, he was again at the head of the army on the Rhine, was several times victorious over Jourdan, protected Swabia, and successfully opposed Massena. In 1800, bad health compelled him to retire from active service; but being appointed governor-general of Bohemia, he formed a new army there. After the battle of Hohenlinden, he was again called to the chief command, and succeeded in staying the rapid progress of Moreau, but almost immediately entered into an armistice with him, which was followed by the peace of Luneville. In 1805, he commanded the army opposed to Massena in Italy, and fought the hard battle of Caldiero; but upon bad tidings from Germany, retreated from the left bank of the Adige to Croatia. This retreat was one of his greatest military achievements. In 1809, he won the great battle of Aspern, which first shewed to Europe that Napoleon was not invincible; but he did not promptly enough follow up his victory, and Napoleon, who hastened to reinforce his army, retrieved his fortunes at Wagram, and the archduke was now compelled to give way before the enemy, till he reached Znaim, where an armistice was concluded on 12th July. In the campaigns of 1813 and 1814 he had no part; and lived in retirement till his death, 30th April 1847.

CHARLES I., king of England, Scotland, and Ireland (1625—1649), was born at Dunfermline, 19th November 1600, and was the second son of James I. of England (VI. of Scotland). On the death of his elder brother, Henry, in 1612, he became Prince of Wales, and heir-apparent to his father's throne; to which he succeeded in 1625, but found both in England and Scotland a contest in progress between king and people. He had inherited from his father the most extreme notions of kingly prerogative, and he mistook the general movement in the public mind for an agitation amongst a few disaffected persons. He had deeply imbibed his father's notion, that an Episcopal church was the most consistent with the proper authority of kings; and he adopted severe and persecuting measures against the Puritans in England and the Presbyterians in Scotland. He married a Roman Catholic, Maria Henrietta of France, a marriage most displeasing to the nation; and even so far despised public opinion as to make his father's favorite, the Duke of Buckingham, his prime minister and chief adviser. The English parliament, which he assembled in 1625, was resolved upon the vindication of the national liberties, and was therefore very sparing in its grants of subsidies, while that of 1626, instead of freely granting supplies, resolved upon the impeachment of Buckingham; whereupon the king threw into prison two of the boldest members, Elliot and Digges; dissolved parliament; and, to procure money, had recourse to the arbitrary measures of forced loans, and a tax upon the seaports (*ship-money*), imposed by the mere exercise of royal authority. By all this, public feeling was more and more embittered. In 1628, C. found it necessary again to summon a parliament; and the parliament, very resolute to maintain the liberties of the nation, presented the petition known in history as the *Petition of Right* (q. v.). C. temporised, conceded, and finally, although the assassination of Buckingham had removed one cause of strife, assumed a threatening tone, and dissolved the parliament 10th March 1629. He even caused some of the leading members of the House of Commons to be imprisoned. He now governed for eleven years without a parliament, having Laud (q. v.) and Strafford (q. v.) for his chief advisers, and obtaining for his edicts the semblance of a legal sanction by means of the Star Chamber (q. v.). All this while, the storm was gathering the love of liberty increased, and republican principles were developed and extended. The policy which C. adopted was that of more severe repression. At length, in 1638, Scotland assumed an attitude of determined resistance to the imposition of a liturgy and of Episcopal church-government. The National Covenant (q. v.) was

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subscribed. Presbyterianism was completely restored; and in 1639, the king having assembled an army for the purpose of reducing Scotland to subjection, the Scottish Convenanters also took up arms, and advanced to the English border, many of the English regarding their approach with joy. Civil war was, however, prevented for the time, by concessions on the part of the king. Unable to do without supplies any longer, C. summoned an English parliament in 1640, which, instead of listening to his demands, began to draw up a statement of public grievances. C. soon dissolved the parliament, and assembled an army to resist the Scots, who had again taken up arms and entered England; but his army was defeated by them at Newburn-upon-Tyne, and they advanced southward, with the sympathy and good-wishes of no small part of the king's English subjects. Much against his will, C. was now compelled again to call a parliament, whose memorable sittings began on 3d November, 1640. Both Houses were resolute in their opposition to his despotism. They began by the impeachment of the ministers and high officers of state, and declared the decrees of the Star Chamber and Court of High Commission to be null and void. They passed a bill in favor of triennial parliaments; and the king, in trepidation, gave it his assent. He also consented, although against his own convictions, to the execution of Strafford; and even gave his assent to an act which provided that the present parliament should not be dissolved, prorogued, or adjourned, without its own consent. Hoping to win the favor of the Scots, he now visited Scotland; but whilst he was there, a rebellion broke out in Ireland, accompanied with a fearful massacre of Protestants. The prospect of a peaceful accommodation was now almost destroyed; the English parliament enlarged its demands; the king, after seeming to yield, took the extraordinary step of suddenly, on 4th January, 1642, appearing in the House of Commons, accusing five members—Pym, Hampden, Hollis Hazelrig, and Stroud—of high treason, and demanding that they should be delivered up to him. Both Houses of parliament espoused their cause, and the city of London shewed a determination to defend them by arms. C. left London with his family, and the parliament declared the kingdom in danger. Civil war began; the royalists had at first the advantage, but the national feeling was with the parliament. Negotiations were from time to time opened or renewed, but always in vain. After the battle of Nasby, on 15th June 1645, in which his army was almost annihilated by the parliamentary troops under Fairfax and Cromwell, C. was compelled to seek refuge in the Scottish camp. Negotiations still proving fruitless, he was delivered up to the English parliamentary army. Negotiations were still attempted with C. in his captivity, but resulted in nothing. Finally C. fled, was taken, refused the ultimatum of the army, and so enraged Cromwell and the Independents that parliament was obliged to pass an act declaring all negotiation with the king to be treason. The Presbyterians of England and the Scots, who were always haunted by the idea that there was something sacred and inviolable in monarchy, thought to rescue the king from the hands of the Independent, but were defeated, and all the Presbyterians were forcibly expelled from the English House of Commons, which now consisting only of about 60 members—the *Rump parliament*—appointed a court composed of persons from the army, the House of Commons, and the city of London, to try the king. The court was opened with great solemnity in Westminster Hall on 20th January, 1649. About 70 members took part in its proceedings. On the 27th of January C. was condemned to death as a tyrant, murderer, and enemy of the nation. The Scots protested, the royal family entreated, and the court of France and States-General of the Netherlands interceded, but in vain. On 30th January, 1649, he was beheaded in front of the palace of Whiteball. In his last hours he shewed great calmness and presence of mind. In his private character C. was a man of cultivated mind, kind, and of irreproachable life; but in political affairs he was unscrupulous, and had recourse to dissimulation and falsehood for the accomplishment of his purposes. In the estimation of many who do not condemn it on moral grounds, his execution was a great political blunder. From the restoration of Charles II., the 30th of January was observed in the Church of England with special religious services, as the day of *King Charles the Martyr*. This commemoration, offensive to great part of the community, and of the members of the Established Church itself, was abolished by act of parliament in 1859.

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CHARLES II., king of England, Scotland, and Ireland (1649—1685), the eldest son of Charles I., was born 29th May 1630, and went with his mother to France during the civil war. He was at the Hague at the time of his father's execution, and immediately assumed the title of king. He meditated an expedition to Ireland for the assertion of his claims, when the Scots offered him their crown in 1650, and proceeding to Scotland, he was crowned at Scone in the beginning of 1651. The limitations, however, under which he received the crown, were disagreeable to him, and he hated the restraint put upon his inclinations by the Presbyterian clergy. After the defeat of the Scots at Dunbar, he put himself at the head of their army, in hope of rousing the royalists of England to his support; but was completely defeated by Cromwell, at Worcester, on 3d September 1651. He made his escape, amidst many dangers, to France, where his situation was by no means agreeable, and from which he went to Cologne, and afterwards to the Netherlands. After Cromwell's death, the desire of the English for a settled government leading to the restoration of the House of Stuart, he landed at Dover, on 26th May 1660, was received with acclamation by the people, and ascended the throne almost untrammeled by a single condition. He was surrounded by men of extreme party-feeling, among whom the most influential was the chancellor, Clarendon (q. v.). The persons immediately concerned in the death of Charles I. were brought to the scaffold; Episcopacy was restored; and the Presbyterians and other Nonconformists, both in England and Scotland, were subjected to great hardships and persecution. The king was extravagant, and soon found himself in want of money: he married the Princess Catharine of Portugal, for the sake of her large dowry; he shamefully sold Dunkirk and Mardyke to the French; and for a pecuniary consideration, agreed to make war against the United Provinces, although such a war was contrary to all the feelings of the English people and the interests of English commerce. The Dutch fleet, under De Ruyter, entered the Thames, and C. was compelled to make an ignominious peace. After the fall of Clarendon, the ministry known as the Cabal (q. v.) ministry came into power—a ministry hateful to the country, composed of unprincipled men, and bent upon the restoration of Popery and absolute monarchy. C. sought to conciliate the people by the *Triple Alliance*, in May 1668, with Sweden and the States-General; but the French court soon found means to persuade him again to make war against the United Provinces. He basely accepted pecuniary gifts and a pension from the French government; and, as even this, with all that he could get from his parliament, was insufficient for his expenses, he had recourse to illegal means of raising money. The story of the "Popish Plot" (q. v.) against the life of the king caused prodigious excitement amongst the people, and Lord Stafford and many other persons were most unjustly brought to the scaffold. The parliament of 1679, very much against the will of the court, enacted the celebrated *Habeas Corpus Act* (q. v.); and a bill was under consideration for the exclusion of the king's brother, the Duke of York, from the throne, on account of his avowal of the Roman Catholic religion. The king, at this period of his reign, had, however, completely crushed the Presbyterians of Scotland, and was more absolute than any of his predecessors had been on either of the British thrones. Most arbitrary measures were adopted. The city of London was deprived of its privileges, because of the election of a sheriff disagreeable to the court. The "Rye-House Plot" (q. v.), a widely extended conspiracy, and in which the king's natural son, the Duke of Monmouth (q. v.), was concerned, was discovered in 1683, and cost the lives of a number of persons, amongst whom were Lord Russell and Algernon Sidney. C., however, appears to have recognised the necessity of a more liberal policy, when he was unexpectedly carried off by death, on 6th February, 1685. In his dying hours, he called in the assistance of a Roman Catholic priest, although he had not previously avowed his attachment to that religion. His reign was full of events dishonorable to his country, and of which he himself was generally the cause. His life was most dissolute; his adulteries, and the profligacy of his court, scarcely paralleled in British history. He had an affability, however, which won for him a certain sort of popularity.

CHARLES V., surnamed the Wise, king of France (1364—1380), was the son of King John, and was born on 21st January, 1337. His father being made prisoner by the English at the battle of Poictiers, on 19th September 1356, he assumed the regency. The most significant events which occurred under his rule, were the

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vigorous efforts of the *bourgeoisie* to deliver themselves from the tyranny of the nobles and the court, and the peasant war called the *Jacquerie* (q. v.). His father dying, 8th April, 1364, C. ascended the throne, and by his cautious policy rescued the kingdom from some of its troubles, and re-established the power of the crown, which had been much shaken. War with England raged for a number of years, but with results highly favorable to C., who stripped his enemies of all their conquests in France, except a few fortified places. He died 16th September, 1380. C. was fond of books and the company of learned men, but was not above the natural weakness of kings for outward pomp and magnificence.

CHARLES VI., king of France (1380—1422), born at Paris, 3d December 1368, was the son and successor of Charles V. He was only 13 years of age when his father died. For several years, his uncle, the Duke of Anjou, acted as regent. In 1388, C. took the reins of government into his own hand, but during his lifetime was so often afflicted with insanity, that party-strife raged without much check. The two great families whose influence divided the nation, were those of Orleans and Burgundy. It was the Orleans party which called in the assistance of the English, and brought about the battle of Agincourt, so disastrous to the French nation. Subsequently the Burgundians allied themselves to the English, who laid waste the whole of northern France. In the midst of these calamities, C. died 21st October 1422.

CHARLES VII., king of France (1422—1461), the son and successor of Charles VI., was born on 22d February 1403. On his father's death he was at the head of an army, with which he held possession of the southern provinces of the kingdom; Paris and the North being in the hands of the English who proclaimed Henry VI. of England king of France, and appointed the Duke of Bedford regent. For some time the events of war were unfavorable to C., who was compelled, in 1424, to evacuate Champagne, and, in 1425, Maine. In 1426, the Count Dunois gained the first victory over the English at Montargis; but in the year following they besieged Orleans, a place of great importance to C., as securing a connection with the North, and he was roused to fresh energy. At this time, also, Joan of Arc (q. v.) the Maid of Orleans, by her, wonderful courage and confidence of a heavenly mission, roused the fervor both of nobles and people. The siege of Orleans was raised in May 1429; the English retired disheartened, and gradually lost their acquisitions in France. A treaty between the French king and the Duke of Burgundy greatly advanced the French cause. In 1436, C. entered Paris; and during the further progress of the war, the English lost all their strongholds except Calais. In 1452, they were finally defeated at Castillon. After he was established on his throne, C. devoted himself to the reorganisation of the government, in which everything had fallen into confusion, but shewed a strong anxiety to frame it according to a scheme of perfect despotism, and for this purpose to provide himself with a powerful and well-disciplined standing army, which caused some discontentment among the nobles of his kingdom. His government, however, was mild, and under it France recovered in some measure from the effects of the terrible calamities which it had endured. His last years were embittered by the conduct of his son, the Dauphin, afterwards Louis XI.; and his apprehension that his son would poison him was so strong, that his consequent abstinence from food is supposed to have hastened his death, which took place at Meiun on 22d July 1461.

CHARLES VIII., king of France (1483—1498), was born at Amboise on 30th June 1470, and succeeded to the throne on the death of his father, Louis XI. For some time the government was carried on under the regency of his sister, Anne of Beaujeu. When C. attained his twenty-first year, he took the royal power into his own hand, and soon developed a bold and ambitious spirit. The most important incident of his career was his conquest of Naples in 1495, to the throne of which he believed he had a claim. The Italian princes and other European potentates were alarmed by his success. A league was hastily formed between the pope, the emperor of Germany, Ferdinand of Spain, the republic of Venice, and Sforza, Duke of Milan, to oppose his return to France. C., however, gallantly broke through the allied forces near Piacenza, and effected a retreat to his own country. It was with difficulty he was hindered by his councillors from resuming his warlike designs on Italy. C. is also said to have meditated the expulsion of the Turks from

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Europe, and making himself emperor of Constantinople; having received from Andreas Palæologus, the grandson of the last Grecian emperor, a transference of his claims to the Byzantine throne. He died 7th April 1498.

CHARLES IX., king of France (1560—1574), the second son of Henry II. and of Catharine de' Medici (q. v.), was born at St Germain-en-Laye on 27th June 1550, and on 5th December 1560 succeeded to the throne on the death of his brother, Francis II. His character was a compound of passion, acuteness, heartlessness, and cunning. Although only 24 years of age when he died, so well had his detestable mother trained him to a love of perfidy and cruelty, that he found time, with her assistance and that of the Guises, to perpetrate an act so hideously diabolical, that all civilised Europe still shudders at the recollection. The massacre of St Bartholomew's (q. v.), 24th August 1572, was the culmination of a series of treacheries towards the Huguenots, which disgraced his reign. The result was, that civil war broke out anew, and assumed a very threatening character, as political malcontents associated themselves with the Protestants. C. died May 30, 1574.

CHARLES X., king of France (1824—1830), third son of the Dauphin Louis, and grandson of Louis XV., was born at Versailles, 9th October, 1757. He received the title of Count d'Artois, and in 1773 married Maria Theresa of Savoy. After the events of 14th July, 1789, he and the Prince of Condé took the lead in the emigration. In 1796 he sailed from England with a squadron under Commodore Warren, on an expedition to the western coasts of France, whereupon twenty departments rose in insurrection; but he had not courage to land and place himself at the head of the insurgents, whom he basely left to the vengeance of the republicans. Detested now by the royalists of France, and despised by the British, he lived in obscurity until the allies entered Paris in 1814, when he appeared in France as lieutenant-general of the kingdom, and issued a proclamation announcing the end of despotism, of conscriptions, and of oppressive taxes. After the second restoration he took little open part in politics, but lived surrounded with priests, Jesuits, and nobles of the old school; and in this circle originated the tyrannical and unconstitutional measures to which even Louis XVIII made considerable opposition, but which at this time disgraced the government of France. The death of Louis, on 16th September, 1824, brought C. to the throne. He took the oath of adherence to the charter, but soon displayed his intention of restoring as much as possible the absolutism of the old French monarchy. Popular discontent rapidly increased. A royal speech, of a threatening character, on 21 March 1830, was followed by an address of remonstrance, signed by 221 deputies, upon which the king dissolved the chambers. The deputies who signed the address were all re-elected, but the court taking fresh courage from the success of the expedition to Algiers, the celebrated ordinances of 25th July were signed by the king, putting an end to the freedom of the press, already largely curtailed, appointing a new mode of election, and dissolving the recently elected chamber. The capital took up arms, the guards refused to act, and the king soon found himself compelled to flee. As a last resource, he abdicated the throne, on 2d August 1830, in favor of his grandson, Henry, Duke of Bordeaux; the Dauphin also consenting to this act. But it was too late; the revolution was accomplished, and Louis Philippe, Duke of Orleans, was chosen king of the French. C. made his escape to England, resided for some time at Holyrood, and afterwards at Prague. He took no part in the political intrigues and attempts of the Duchess de Berri. He died of cholera at Görz on 6th November 1836. His only surviving descendant, in the male line, is his grandson, the Count of Chambord (q. v.).

CHARLES IV., German emperor (1346—1378), was born at Prague in 1316, and was the son of King John of Bohemia, of the House of Luxembourg, who fell in the battle of Crecy. At the instigation of Pope Clement VI., to whom he had previously taken an oath of humiliating submission at Avignon, he was elected emperor by a portion of the electors on the 11th July 1346, although Louis IV. then actually filled the imperial throne. But even after the death of Louis, it was not without difficulty that he obtained secure possession of it. He was crowned king of Italy at Milan in 1354, and emperor at Rome in 1355. In 1356, he issued the Golden Bull (q. v.), the fundamental law concerning the election of German emperors; in defiance of the very letter of which he afterwards, by large bribes, secured for his

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own son, Wenceslaus, the succession to the empire. He died at Prague, 29th November 1378. C. was an artful politician, but destitute of true greatness. He sought the support of the clergy by undue concessions, sold rights and privileges in Italy and other parts of the empire for money, and cared chiefly for the prosperity of his hereditary kingdom of Bohemia.

CHARLES V., German emperor, was born at Ghent on 24th February, 1500. He was the eldest son of Philip, Archduke of Austria, and of Joanna, the daughter of Ferdinand and Isabella of Spain. Philip's parents were the Emperor Maximilian and Maria, daughter and heiress of Charles the Bold, Duke of Bergundy. On the death of his grandfather, Ferdinand, in 1516, C. took possession of the throne of Spain by the title of Charles I., his mother, Joanna being of disordered intellect and incapable of reigning. He was not, however, very favorably received by the Spanish nobles, who were doubtful of his right and jealous of the followers whom he brought from the Low Countries, where he had been educated. All the abilities of his famous minister Ximenes (q. v.) were requisite to prevent an open revolt. On the death of Maximilian in 1519, C. was elected German emperor from amongst a number of competitors, chiefly through the influence of the Elector Frederic of Saxony. In his earlier years he had been frivolous and dissolute, but he now became mindful of the duties and dignity of his high position. On 22d October, 1520, he was crowned at Aix-la-Chapelle, and received from the pope the title of Roman emperor. He ascended the imperial throne at a time when Germany was in a state of unprecedented agitation concerning the doctines proclaimed by Luther. To restore tranquility, a great diet was held at Worms in 1521, Luther's declaration of his principles before which forms a well known and most important passage in the history of the Reformation. In 1522 he reduced to subjection the towns of Castile, which had leagued themselves together for the maintenance of their ancient liberties. He was likewise successful in his war against the Turks under Solyman the Great. C. was involved also in a struggle of long duration with France, in which, after many alternations of fortune, his armies at last drove the French from the greater part of their conquests in Italy; and Francis I. of France fell into his hands as a prisoner, after a battle by which the siege of Pavia was raised on 24th February, 1525.

The pope, however, began to grow alarmed at his victories, and therefore allied himself with France and the principal Italian states, and released the king of France from the obligations under which he had come by his treaty with Charles. It was the pope's object to exclude C. from all dominion in Italy; but the emperor's forces under Charles of Bourbon, the former Constable of France, took Rome itself by storm, plundered it, and made the pope prisoner. C. pretended great regret for this, went into mourning with all his court, and caused prayers to be said for the pope's liberation, whilst by his own directions the pope was kept for seven months a captive. Peace was concluded in 1529, on terms most favorable for the emperor. He now thought to put an end to the religious differences in Germany, and to repel the Turks, who had overrun Hungary and laid siege to Vienna. But the Diet at Augsburg in 1530, proved how vain was the hope of restoring the former state of things in Germany; and the emperor refusing to recognise the confession of the Protestants, they refused to help him against the Turks. In 1531, the Protestant princes formed the League of Smalcald (q. v.), and allied themselves with France and England for their own protection. This, and the continued assaults of the Turks, compelled the emperor to yield in some measure to the demands of the Protestants. In 1535, C. undertook an expedition from Spain against the pirate Barbarossa, who had established himself in Tunis, and whose vessels did prodigious injury to the commerce of Spain and Italy. In this expedition he was completely successful, and set free no fewer than 22,000 Christians, who had been held as slaves. War again broke out with France; an armistice for ten years was concluded in 1538; and C. even visited Paris, where he was magnificently entertained. But the war broke out afresh in 1542, and terminated in favor of the emperor; who also triumphed in the battle of Mühlberg, 25th April 1547, over the Protestant princes of Germany, and deprived the Elector John Frederic of Saxony of his territories. But he shewed so plainly his intention of converting the German empire into a hereditary possession of his family, that new opposition arose, and C. was compelled to flee before the arms of Duke

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Maurice of Saxony and the Protestants, and in 1552 to promise them the peaceful exercise of their religion, which was confirmed by the Diet at Augsburg in 1555. Henry II. of France also took from C. some parts of Lorraine. His health failing, C. now declared, in the assembly of the States at Louvaine, his resolution to seek repose, and devote the remainder of his days to God. He resigned the government of his dominions to his son, for whom, however, he vainly sought to secure the imperial throne; and having relinquished to him the crown of Spain on 15th January 1556, he retired to the monastery of Yuste, in Estremadura, where he spent two years partly in mechanical amusements, partly in religious exercises, which are said to have assumed a character of the most gloomy asceticism, and died on 21st September 1558. By his wife Isabella, daughter of King Emmanuel of Portugal, he had one son, his successor, Philip II. of Spain, and two daughters. His brother Ferdinand succeeded him in the empire.

CHARLES VI., German emperor (1711—1740), the last of the proper male line of the House of Hapsburgh, was the second son of the Emperor Leopold I., and born 1685. His father intended for him the crown of Spain; but Charles II. of Spain, yielding to French intrigues, assigned it by testament to Philip of Anjou, whereupon arose the great war of the Spanish succession—Britain and Holland taking part with the emperor against France, for the maintenance of the balance of power in Europe. C. was acknowledged by the allies as Charles III. of Spain, but had not succeeded in obtaining permanent possession of the kingdom, when the death of his brother, the Emperor Joseph I., recalled him to Germany in 1711; and as he now became emperor of Germany, Britain and Holland concluded the Peace of Utrecht with France in 1713. C. continued the war for some time longer; but was at last obliged to give up his claim to Spain, being confirmed, however, in possession of the Spanish Netherlands and of the Spanish possessions in Italy. Success attended his arms in a war against the Turks, and in a war with Spain, which arose out of the projects of the Spanish minister Alberoni, and in which the *Quadruple Alliance* was formed —France, Britain, and Holland joining the emperor against Spain. But C., having lost his only son, and being very anxious to secure the throne to his own descendants, named his daughter, Maria Theresa (q. v.), as his heiress, by a *Pragmatic Sanction* (q. v.), to which he had much difficulty in obtaining the consent of some of the German states and some foreign powers; and to accomplish this object he gave up Tuscany, Parma, and Piacenza, and afterwards Naples, Sicily, Lorraine, and some parts of Milan. Meanwhile, he was unsuccessful in wars with France and Spain, and with the Turks, who compelled him, in 1739, to resign his former conquests. He died 20th October 1740. He was of a mild and benevolent disposition, but full of superstition and of prejudices in favor of feudalism and ecclesiastical domination.

CHARLES VII., German emperor (1742—1745), was born at Brussels in 1697, and was the son of Maximilian Emmanuel, Elector of Bavaria, and for some time governor of the Spanish Netherlands. After the conquest of the Bavarian territories, and the pronunciation of the ban of the empire against his father by the Emperor Joseph I., he was for some time the emperor's prisoner; but after the decease of Joseph, he married his youngest daughter; and having, in 1726, succeeded his father as Elector of Bavaria, refused his consent to the Pragmatic Sanction (see preceding article); and on the death of Charles VI. in 1740, advanced a claim to the Austrian dominions in right of his wife, and upon the further ground of a testament of Ferdinand I. Success at first attended his arms; he was acknowledged as Archduke of Austria, and then as king of Bohemia, upon which he was also, in 1742, elected emperor. But the tide of fortune now turned against him. The Hungarians rose in favor of Maria Theresa, and he was driven from Austria and from Bohemia, and for a time even from his Bavarian capital, Munich. Disease and calamities combined to cause his death, 20th January 1745, shortly before which he said, "Misfortune will never leave me, till I leave it."

CHARLES X., or Charles-Gustavus, king of Sweden, was born at Nyköping, 8th November 1622. After studying at the university of Upsala, he travelled through France, Germany, and Switzerland, joined the army of Torstensohn (q. v.) in 1642, fought at the battles of Yankovitz and Leipzig; and at the close of the war was the representative of Queen Christina at the conferences which were held for giving

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effect to the treaty of Westphalia. On the abdication of Christina, Charles-Gustavus, who was the son of Gustavus Adolphus's eldest sister Catharine, and John Casimir the Palatin of Zweybruck in Clerburg, succeeded as next heir, 17th June 1654, to the throne of a kingdom which, after his accession, he discovered to be in an almost bankrupt condition. There was a debt of 10,000,000, while the revenue did not amount to 800,000 crowns, out of which one-fourth was granted as a pension to the ex-queen, whose carelessness and extravagance had brought about this deplorable state of matters, and who, in the words of the aged chancellor Oxenstierna, "had cost Sweden dearer than ever an enemy did." She had taken away everything belonging to the royal residences which was portable; and C. was forced at first to borrow even a set of kitchen utensils. C. was the second of the three great warrior-monarchs of Sweden, but unlike his uncle, who could plead religious grounds, and his grandson, who was at first forced to fight for self-preservation, C. seemed to make war principally for war's sake. First he attacked Poland in July, 1655, because the Polish monarchs had not resigned their claim to the Swedish throne; captured in the same year Warsaw, Cracow, Thorn, Elbing, Posen, and Kalicz; and drove the king to take shelter in Silesia; he then assailed the Danes, who had declared war against him, crossed the Belts on the ice, and speedily made himself master of all the continental possessions of Denmark. Next marching from isle to isle over the frozen sea, he ultimately, by menacing Copenhagen, compelled the treaty of Roskild (7th March, 1658) which gave to Sweden, Holland, Scania, Bleckingen, Bornholm and the other Danish possessions beyond the Sound, and emancipated Sweden from the Sound Dues. Charles, however, still cherished enmity against the Danes; and after fruitlessly proposing to the Dutch and English a partition of Denmark, he invaded Zeeland, and attacked Copenhagen in 1659. The capital, however, defended itself valiantly, aided by succor from the Prussians and Dutch; and the Swedish monarch was compelled to abandon the siege. Soon after, while laboring to effect a complete reconciliation with Poland in order to be free to attack the Danes in Norway, he died suddenly at Gothenburg, February 23, 1660.

CHARLES XI., one of the ablest kings of Sweden, was the son of King Charles (X.) Gustavus, and was born November 24, 1655. While he was little more than four years old at his father's death, the government was committed to his mother Hedwig as regent, and a council. The peace of Oliva (May 3, 1660) with Poland, by which Sweden obtained Esthonia, part of Livonia, and Oesel, and the Polish monarch renounced all pretensions to the Swedish crown; and that of Copenhagen (June 6, 1660), generally confirmatory of the treaty of Roskild with Denmark, were the first important acts of the government. A treaty with Russia on the basis of the *status quo* followed in 1661; and from this period till 1672, the kingdom was free from foreign wars. In December 1672, C. (whose education had been so ill attended to that he had reached manhood before he could read) took the reins of government, and by the allurements of France, was induced to make war on Brandenburg. This unprovoked attack was disastrous to the Swedes, for they suffered a severe defeat from the elector at Fehrbellin (1675); and though C. revenged himself by defeating the Danes (who were allied with Prussia) at Halmstadt, Lemd, and Landskrona, his fleet was defeated by the Dutch near Oeland, and again by the Danes at Bleking and Kiöge; and many of Sweden's recent acquisitions were wrested from her. These, however, were restored by the peace of Saint-Germain-en-Laye (17th September 1679), which closed this needless and unfortunate contest. In 1680, a struggle commenced between the crown, supported by the burghers and peasants, on one hand, and the nobles on the other; and a considerable diminution of the power of the nobles was the consequence. The resumption of all the crown lands which had been alienated since 1609, was a fatal blow to the preponderating power of the nobles; and by a voluntary declaration of the states, December 9, 1682, the king was invested with absolute authority. This voluntary erection of a despotism by the people, a thing of rare occurrence in the world's history, is yet more extraordinary at the close of the 17th c.; and it speaks highly for C. that he never employed his unlimited authority otherwise than for the best interests of his kingdom. By a judicious administration of the revenues, he was enabled to extinguish the public debt (1686), reorganise the fleet and army, and by 1693 to dispense with the calling up of extraordinary subsidies. Though

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absolute, he never imposed a tax but with consent of the states; and he every year published a detailed account of revenue and expenditure. In 1698, he was formally declared absolute by an act of the diet. The foreign policy of the country was also conducted in a manner equally satisfactory and effective. Deux-Ponts fell to him as heir to his cousin Friedrich-Ludwig, the last palatine, in 1681; the attempts of the Danes upon Holstein were rigorously repressed, and many small outlying territories were brought under his sway. His anxiety for his subjects' welfare was particularly shown by commercial and maritime regulations superior to any that then existed in Europe; and by his numerous journeys to all parts of his dominions to examine for himself into the remote details of the administration. A codification of the laws was commenced, but was unfinished at his death, which took place at Stockholm, 15th April 1697.

CHARLES XII., king of Sweden (1697—1718), was the son of Charles XI., and was born at Stockholm on 27th June 1682. On the death of his father in 1697, he ascended the throne, and notwithstanding his youth, the States declared him of age to assume the reins of government. The neighboring powers thought this a favorable time to humble Sweden, then the great power of the north; and Frederick IV. of Denmark, Augustus II. of Poland, and the Czar Peter I. concluded a league for this object. The Danes began by invading the territory of the Duke of Holstein Gottorp, who had married C.'s eldest sister, and who applied to him for assistance. The young king immediately resolved on the most active measures, and approached Copenhagen with such a force as presently compelled the Danes to make peace. C. now hastened to meet the Russians; and although they lay in an intrenched camp beneath the walls of Narva, 50,000 strong, he stormed their camp on 30th November, 1700, with 9000 Swedes, and defeated them with great slaughter. He next dethroned Augustus II., and procured the election of Stanislaus Leszczynski as king of Poland. Augustus supposed himself safe at least in Saxony, his hereditary dominion, but was followed thither, and humbling terms of peace were dictated at Altranstädt in 1706. C. obtained from the emperor liberty of conscience for the Protestants of Silesia. Leaving Saxony with an army of 43,000 men in September 1707, he proposed to advance direct upon Moscow; but at Smolensk he was induced, by the representations of the Cossack *hetman* Mazeppa, to change his plan and proceed to the Ukraine, in hope of being joined by the Cossacks. In this hope, however, he was disappointed, and after enduring many hardships, he was defeated by the Russians at Pultowa, on the 27th June 1709, and fled to Bender in the Turkish dominions.

Augustus II. now revoked the treaty of Altranstädt, and the czar and the king of Denmark assailed the Swedish territories. But the regency in Stockholm adopted measures of effective and successful resistance, and C. prevailed with the Porte to declare war against Russia, in which Peter seemed at first likely to have suffered a severe defeat. But Russian agents succeeded in inspiring the Turks with suspicions concerning the ultimate designs of C., who was conveyed to Adrianople, but after some time escaped, and made his way through Hungary and Germany, pressing on by day and night with extraordinary speed, till he reached Stralsund, where he was received with great joy, on 11th (22d) November 1714. He was soon, however, deprived of Stralsund by the allied Danes, Saxons, Prussians, and Russians. After he had adopted measures for the security of the Swedish coasts, his passion for war led him to attack Norway. Success appeared again to attend his arms, when, in the siege of Friedrichshald, on 30th November 1718, he was killed by a musket-bullet. On his death, Sweden—exhausted by his wars—ceased to be numbered among the great powers. He was a man capable of comprehensive designs, and of great energy in prosecuting them. His abilities appeared not merely in military affairs, but in his schemes for the promotion of trade and manufactures. His self-willed obstinacy, however, amounted almost to insanity; in fact, he has been termed "a brilliant madman." His habits were exceedingly simple: in eating and drinking, he was abstemious; and in the camp, he sought no luxuries beyond the fare of the common soldier.

CHARLES XIII., king of Sweden (1809—1818), born October 7, 1748, was the second son of King Adolphus Frederick, and of the sister of Frederick the Great of Prussia. He was trained for naval command, and was long the High Admiral of

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Sweden, in which capacity he distinguished himself by a great victory over the Russians in the Gulf of Finland in 1788, and by bringing back his fleet safe to Carlscrona in the most perilous season of the year. He was on several very important occasions called to an active part in political affairs—in the revolution of 1772, when he was made governor-general of Stockholm and Duke of Södermanland, after the assassination of his brother Gustavus III. in 1792, when he was placed at the head of the regency; and after the revolution of 1809, when he became administrator of the kingdom, and subsequently king. The Swedish monarchy now became limited instead of despotic. Having no child, C. concurred with the States of the kingdom in choosing as his successor the French general, Bernadotte, who became crown-prince of Sweden, and ascended the throne on the death of C., February 5, 1818. The prudence of the king and crown-prince secured the union of Norway with Sweden in 1814, as a compensation for Finland.

CHARLES XIV., king of Sweden and Norway (1818—1844), originally JEAN BAPTISTE JULES BERNADOTTE, was born at Pau, in the south of France, January 26, 1764. He was the son of a lawyer. He entered the French army as a common soldier: became an ardent partisan of the revolution; greatly distinguished himself in the wars of Napoleon, and soon attained the highest military rank. But he was distrusted by Bonaparte, whose ambitious schemes he took no part in promoting; and Napoleon having taken offence at his conduct after the battle of Wagram, Bernadotte left the army in disgust, and returned to Paris. He was afterwards sent by the ministerial council to oppose the British, who had landed at Walcheren, but the breach between the emperor and him grew wider. In 1810, he was elected crown-prince, and heir to the throne of Sweden. Almost the only condition imposed on him was that of joining the Protestant church. He changed his name to Charles John; and the health of the Swedish king, Charles XIII., failing in the following year, the reins of government came almost entirely into his hands. He refused to comply with the demands of Napoleon, which were opposed to the interests of Sweden, particularly as to trade with Britain, and was soon involved in war with him. He commanded the army of the allies in the north of Germany, and defeated Oudinot at Grossbeeren, and Ney at Dennewitz. He shewed great reluctance, however, to join in the invasion of France, and was tardy in his progress southward.—He became king of Sweden on the death of Charles XIII., February 5, 1818. He won for himself the character of a wise and good king. Education, agriculture, manufactures, commerce, and great public works, as well as the military strength of the kingdom, were promoted by his care. He died March 8, 1844, and was succeeded by his son Oscar.

CHARLES ALBERT, king of Sardinia (1831—1849), born 2d October 1798, was the son of the Prince Charles Emmanuel of Savoy-Carignan, and in 1800, succeeded to his father's title and estates in France and Piedmont. In 1817, he married Maria Theresa, daughter of the Archduke Ferdinand of Tuscany. When the revolutionary movement took place in Piedmont in 1821, he was made regent, upon the abdication of Victor Emmanuel, until Charles Felix, the brother of the late king, should arrive to assume the sovereignty. He displeased both the liberal party and their opponents, and Charles Felix disallowed all his acts, and for some time forbade his appearance at court. In 1829, he was appointed viceroy of Sardinia. On the death of Charles Felix, 27th April 1831, he ascended the throne. The liberals had great expectations from him, but were for a long time disappointed; his government much resembled the other Jesuitic and despotic Italian governments, except that he sought to promote the interests of the country, and to restrict the influence of the clergy in political affairs. It was not till after the elevation of Pius IX. to the popedom, when a new impulse was given to the cause of reform, that the Sardinian government adopted the constitutional and liberal policy to which it has since adhered. C. A. entered warmly into the project of Italian unity, and evidently expected to place himself at the head of the whole movement and of the new kingdom of Italy. When the Lombards and Venetians rose against the Austrian government, he declared war against Austria, 23d March 1848, and at first was exceedingly successful, but was insufficiently supported by the Lombards, and finally defeated by the Austrians; so that after the fatal battle of Novara, 23d March 1849, he was obliged, for the preservation of the integrity of his kingdom, to resign the crown in

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favor of his son, Victor Emmanuel. He afterwards retired to Portugal, and died at Oporto on 28th July of the same year.

CHARLES EMMA'NÜEL I., Duke of Savoy (1580—1630), called the Great, was born at the castle of Rivoli, 12th January 1562, and succeeded his father Emmanuel Philibert in 1580. He married a daughter of Philip II. of Spain, and at first allied himself politically with Spain, and made war against France for the marquisate of Saluzzo (or Saluces), which he obtained in 1601, upon the cession of some other territories to France. But he afterwards joined France and Venice to oppose the preponderant power of Spain in Italy; then allied himself with the House of Hapsburg and set up a claim to Montferrat, but suffered, in consequence, the direst calamities, great part of his dominions being conquered by the French, and in their hands when he died, 26th July 1630. He was a prince of vast ambition, and for whom no enterprise was too bold.

CHARLES THE BOLD, Duke of Burgundy (1467—1477), son of Philip the Good, of the House of Valois, and of Isabella of Portugal, was born at Dijon, on 10th November 1435, and bore, during his father's life, the title of Count of Charolais. He was of a fiery, ambitious, and violent disposition. From an early period to the end of his life he was a declared enemy of Louis XI. of France, the nominal feudal superior of Burgundy. Louis having caused Philip to deliver up some towns on the Somme, C. left his father's court, and formed an alliance with the Duke of Bretagne and some of the great nobles of France for the maintenance of feudal rights against the crown. Their forces ravaged Picardy and Isle-de-France, they threatened Paris, and defeated the king at Montlhéry. The result was a treaty by which the Count of Charolais obtained the towns on the Somme and the counties of Boulogne, Guines, and Ponthieu for himself. In 1467, he succeeded his father as Duke of Burgundy. Richer and more powerful than any prince of that time, he conceived the design of restoring the old kingdom of Burgundy, and for this purpose of conquering Lorraine, Provence, Dauphiny, and Switzerland. Whilst he was making preparations for war, Louis invited him to a conference; he hesitated, and Louis by his agents stirred up the citizens of Liege to revolt. Meanwhile C. consented to the conference, and the news coming of what had taken place at Liege, he seized the king, and if he had not been withheld by his councillor Comines, would have put him to death. He compelled Louis, however, to accompany him to Liege, and apparently to sanction the cruelties which he inflicted on the citizens. War raged between them afterwards with little intermission, till 1475. In September of that year, C. found himself at leisure to attempt the prosecution of his favorite scheme of conquest, and soon made himself master of Lorraine. In the following year he invaded Switzerland, stormed Grandson, and hanged and drowned the garrison; but was soon after terribly defeated by the Swiss near that place, and lost his baggage and much treasure. Three months after, he appeared again in Switzerland with a new army of 60,000 men, and laid siege to Morat, where he sustained, on June 22 1476, another and more terrible defeat. After this he sank into despondency, and left his nails and beard grow. But the news that the young Duke René of Lorraine was attempting to recover his territories, roused him, and he laid siege to Nancy. His army was small; Italian auxiliaries, whom he had hired, went over to the enemy; and in the battle which he too rashly fought, he lost his life, January 5, 1477. His daughter and heiress, Maria, married the Emperor Maximilian I. With his life ended the long successful resistance of the great French vassals to the central power of the monarchy.

CHARLES'S WAIN, a common name for the constellation of Ursa Major (q. v.).

CHA'RLESTON, the chief city of a district of its own name in South Carolina, and the commercial capital of the state, is situated in lat. 32° 46′ n., and long. 79° 57′ w. With straight and regular streets, it occupies the fork of the Cooper and the Ashley, which, as deep tideways of the respective widths of 1400 and 2100 yards, here unite with their common estuary of 7 miles in length to form Charleston harbor. This haven is beset to seaward by a sand-bar, which has its uses, however, as a breakwater and a bulwark. The more practicable of its two passages—chewing 16 feet at ebb, and 22 at flood—is commanded by Fort Moultrie and Fort Sumter.

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The city is built upon ground raised but a few feet above the water. In 1850, the population of C. was 42,985; in 1860, 40,522; in 1880, 49,984. The exports, which are always of much greater value than the imports, amounted in 1858 to $16,924,436; in the year ending March 31, 1875, $19,582,895. In the latter year 744 vessels, of 690,916 tons, entered and cleared the port. In 1872, 282,154 bales of cotton were exported. C. has also a large trade in rice. There are about 40 churches, the State Medical College, a large orphan asylum, &c. C. was founded in 1672, receiving from France, about 1685, a considerable influx of Protestant refugees. It was prominent for zeal and gallantry in the revolutionary war. Up to the time of the civil war, the city was remarkable for its suburban character and verdant surroundings, and its inhabitants were mainly opulent planters, distinguished for hospitality and refinement. It was in C., however, that the first open movement was made in favor of secession; and the city and its inhabitants have changed since then. In 1860 and 1861, the harbor was the scene of several conflicts; and in 1863 Fort Sumter was reduced to ruins. The harbor was blockaded in 1861, and several dismantled hulks of vessels were filled with stones and sunk, in order to prevent passage. In spite of these precautions, however, more British blockade-runners entered this than any other southern port. In August 1863, the city was bombarded, and in February 1865, was occupied by the United States troops.

CHA'RLESTOWN, a seaport of Massachusetts, in lat. 42° 2′ n., and long. 1° 3′ w. It occupies a peninsula about 2 miles long immediately to the north of Boston, the capital of the state, of which, connected as the two are by bridges, it is virtually a suburb. Pop. in 1850, 17,126; in 1860, 25,063; in 1870, 28,323. In common with the rest of the neighborhood, the peninsula displays an unevenness of surface which renders the streets, otherwise handsome, somewhat irregular. Its most prominent height is Bunker's Hill, celebrated as the first battle-field in the revolutionary war, and surmounted in 1825—1843, by a granite monument of 220 feet in height. Besides a state prison on a large scale, the city possesses one of the principal navy-yards of the general government. This establishment, covering 60 acres, contains a magnificent ropewalk 1300 feet long, and a dry-dock of chiselled granite measuring 80 feet in breadth by 30 in depth. C. was incorporated with Boston in 1874.

CHARLET, Nicolas Tonssaint, a French painter and engraver, born in Paris 1792, was for some years employed as a clerk in a government office, but lost his place at the restoration, 1815, on account of his Bonapartism, and in consequence betook himself to art. After studying a while under Gros, he gradually formed for himself a style in which he had no rival. C. is the Béranger of caricature, but without the political bitterness and sarcasm sometimes found in the poet. His genial sketches of French life and manners were studied with equal admiration in the salons of the aristocracy and in the ateliers, barracks, taverns, &c., of the lower classes. C. was especially successful in his sketches of soldiers and children. His designs are free from exaggeration, while full of spirit, interest, and naïveté; and his titles or mottoes were often so witty and suggestive, that dramatic writers have founded pieces upon them. His sketches and lithographs are very numerous, and are widely distributed. Among his paintings the most remarkable are—"An Episode in the Russian Campaign" (in the Museum at Versailles); "Moreau's Crossing of the Rhine" (at Lyon); and a "Procession of the Wounded" (at Bordeaux). C. died in 1845.

CHARLEVILLE, a town of France, in the department of Ardennes, about a mile from Mezières, with which it communicates by a suspension-bridge over the Meuse. It is a thriving place, well built, with clean spacious streets. It has manufactures of hardware, leather, and beer, and the Meuse affords facilities for considerable trade in coal, iron, slate, wine, and nails. Pop. (1872) 11,410.

CHA'RLOCK. See MUSTARD.

CHARLOIS, a village of the Netherlands, situated on the Maas, about two miles south-south-west of Rotterdam. It is memorable on account of a terrible accident which occurred here in 1512, when a religious procession crossing the ice in defiance of a magisterial prohibition, 8000 of them were precipitated into the Maas. Pop. 2000.

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CHARLOTTE AMALIE, chief, or rather only, town of St Thomas, one of the Virgin group of the Antilles, in lat. 18° 20′ n., long. 64° 55′ w. It contains 11,400 inhabitants, nearly three-fourths of the entire population of the colony. It has a spacious harbor, which, besides being largely visited by European ships in general, is a principal station for the mail-packets between Southampton and the West Indies.

CHA'RLOTTE TOWN, the capital of Prince Edward Island, in the Gulf of St Lawrence, in lat. 46° 15′ n., and long. 63° 7′ w. The census of May 1871 states the population at 8807. The port is the best in a colony which, in proportion to its size, is remarkable for its navigable facilities. The town stands on the south-east coast at the bottom of Hillsborough Bay, and at the confluence of three rivers, which each admit the largest vessels for several miles, so as to secure them from all weather. The harbor is rendered still more commodious through the strength of the tides, which enable ships to work out and in against the wind. C. T. has an iron foundry and a woollen factory, and is largely engaged in ship-building.

CHARLO'TTENBURG, a town of Prussia, in the province of Brandenburg, is situated on the Spree, 3 miles west of Berlin, with which it is connected by a road leading through the *Thiergarten*, and affording a favorite promenade to the Berliners. C. contains a royal palace, with a fine garden and splendid orangery, and an interesting collection of antiquities and works of art. In a beautiful part of the park a mausoleum, designed by Schinkel, contains the remains of Frederick William III. and his wife, the Queen Luise, with their statues by Rauch. C. has manufactures of cotton and hosiery. Pop. (1871) 19,518; (1875) 25,900.

CHARM (Lat. *carmen*, a song), properly, a form of words, generally in verse, supposed to possess some occult power of a hurtful, a healing, or a protective kind. Charms exert their influence either by being recited, or by being written and worn on the person; and, in this latter case, they may be classed with Amulets (q. v.). The nature of this superstition will be more fully considered under INCANTATION; see also MAGIC.

CHA'RNEL-HOUSE (Fr. *charnier;* Lat. *caro*, flesh), a chamber situated in a churchyard or other burying-place, in which the bones of the dead which were thrown up by the grave-diggers were reverently deposited. The C. was generally vaulted in the roof, and was often a building complete in itself, having a chapel or chantry attached to it. In such cases, the charnel-vault was commonly a crypt under the chapel; and even in churches, it was not uncommon for the vault or crypt to be employed as a charnel-house.

CHA'RON, in classical mythology, the son of Erebus and Nox, is first mentioned by the later writers of Greece. His duty was to ferry the shades of the buried dead across the rivers of the under-world. For this service, he exacted an *obolus* from each, and in consequence, a coin of this kind was placed in the mouth of the dead. If this rite was neglected, C. refused to convey the unhappy shade across, and it was doomed to wander restlessly along the shores of Acheron. C. is generally represented as a gloomy old man, with a rough beard and wretched clothes. In the Etruscan monuments, he holds a hammer.

CHARR (*Salmo umbla*), a fish of the same genus with the salmon, occurring in the lakes of Britain and of the continent of Europe. It is abundant in the lakes of Cumberland and Westmoreland, and in some of those of Ireland, of the north of Scotland, and of Orkney, but in the greater number of the Scottish lakes it is not found. It is the celebrated *ombre chevalier* of the Lake of Geneva. It is sometimes found weighing more than 2 lbs., but is generally under 1 lb. in weight. It has only the anterior part of the *vomer* (the middle line of the palate) furnished with the teeth, agreeing in this with the salmon and bull-trout, and differing from the common trout, salmon-trout, &c. The form is elongated, the greatest depth of the fish about one-fifth of the entire length; the fins are rather small; the tail deeply forked; the color of the back dark olive, the sides lighter and spotted with either red or white, according to the condition in which the fish is at the time, the belly also being sometimes deep orange, and sometimes of a pale color; these, and other accidental variations, causing the fish to receive different names, such as *Case C.*, *Red C.*, *Gilt C.*, *Silver C.*, and having led some naturalists to believe in the exist-

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ence of different species. It is not yet quite certain whether the *Torgoch* or *Red-belly* of Wales (*Salmo salvelinus* of some authors) ought to be regarded as distinct or as a mere accidental variety. Whilst it is the most delicious perhaps of the *Salmonidæ*, the C. is also the most beautiful; its rich purple, rosy, and crimson tints and white spots rendering it indeed a brilliant and striking object. During summer, the C. haunts chiefly deep cool water, and is seldom seen at the surface till late in autumn. It feeds on insects and minute crustaceans. In the end of autumn or beginning of winter, it ascends rivers to spawn, always choosing those which have a rocky bottom. Whether in lake or stream, it is only to be found in clear waters. Unfortunately, the C. of the English lakes is taken in great numbers, by nets, at the mouths of streams, when about to ascend them in order to spawn, and when not in the best condition for the table.

On some lakes, vast quantities are then caught for the table particularly for the purpose of potting. A C. is now and then taken with fly when the angler may be whipping a lake, which perhaps abounds with them, for trout; but this occurs but seldom. The C. will, too, occasionally take a minnow, if sunk deep and trailed slowly; but the sport it affords is of the most precarious nature. C. are fast diminishing in those of our English lakes which they still inhabit, owing to the wholesale and indiscriminate slaughter which occurs at the spawning season. A large kind of C., sometimes reaching 4 lbs. in weight, is found in some of the more northern Swedish lakes.

CHART, a marine or hydrographical map, exhibiting a portion of a sea or other water, with the islands, coasts of contiguous land, soundings, currents, &c. See MAP. In the English service, when coasts have been surveyed by the Admiralty, charts are engraved, and are sold at various prices, from 8s. down to 6d. each. This price is below their cost, the object being to encourage their general use as much as possible. Men-of-war are supplied with copies of every available C. published, relating to the regions likely to be visited. There is a printed list for every station. At Gibraltar and the Cape of Good Hope, there are dépôts of charts to supply ships whose destination undergoes a change. All the charts are brought home again, and none are reissued until revised and corrected. The navigating charts, shewing the dangers of coasts, with sufficient clearness to enable mariners to avoid them, are generally on the scale of half an inch to a mile; those of larger size shew all the intricacies of the coast. The merchant-service is supplied with charts by agents, who receive a stock from the Admiralty and keep them on sale. The preparation of charts is part of the duty of the hydrographical department of the Admiralty. In the financial year 1876—1877, a sum of no less than £11,000 was provided for this branch, quite irrespective of the surveying that preceded the engraving of the charts, which always costs a much larger sum. In the five years ending with 1875, the Admiralty sold 495,445 charts, besides supplying the Queen's ships.

CHARTA, Magna. See MAGNA CHARTA.

CHARTE (Fr. a charter; Lat. *charta*, paper). In the sense in which we have adopted this word from the French, and in which it may be now said to form part of our language, it signifies a system of constitutional law, embodied in a single document. Whether any system of positive public law existed in ancient France is, in that country, a subject of keen dispute amongst constitutional antiquaries. If any such there was, there seems little doubt that it was the mere embodiment of traditions, and not the result of any single act of the national will. Whilst France was divided into provinces and communes, local liberties and privileges unquestionably existed; but where the nation constituted no single body, a constitutional charter was impossible. The first traces of such a C. appear in the 14th c.; and it is known in the history of the public law of France as the *Grand Charter*, or the charter of King John. Up to this time, the kings had called together only partial assemblies, but in 1355 deputies from the whole kingdom were assembled in the hall of the Parliament of Paris. The nobility and clergy, secular and regular, were represented by 400 deputies, the commons or third estate by a like number. This body assumed to itself the initiative, and prepared a species of constitution, which was accepted by the king. The chief triumph of the third estate on this occasion consisted in carrying through the doctrine, that the decision of any two estates should be invalid without the concurrence of the third. The three orders, who seem to have composed

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but one assembly, then proceeded to impose a series of restrictions on the power of the monarch, which, confirmed by the dauphin two years later, formed the foundation for the liberties subsequently asserted at the Revolution.

But the constitution to which the term C. is most frequently applied by the French and by us, is that in which Louis XVIII. solemnly acknowledged the rights of the nation on his restoration in 1814. This C. has ever since been considered the fundamental law of constitutional monarchy when that form of government has existed in France. In some of its provisions, however, and still more in the mode of its acceptance by the monarch, as "a voluntary and free act of our royal authority," and as a "concession made to," not a contract entered into with, his subjects, it was open to the misconstructions which eventually led to the revolution of 1830. The "charte" sworn to on the 29th August of that year by King Louis Philippe modified this and some of the other provisions of that of 1814. On that occasion, the king explicitly recognised the sovereignty of the people. This document, which, with some modifications, remained in force till the revolution of 1848, is of so much importance, not only from its bearing on the past history, and possibly on the future destiny of France, but from the analogies which it presents to our own constitution, that we shall endeavor to present a condensed view of its leading provisions.

It consisted of 67 articles, divided into 7 heads. Of these, the 1st head, containing 11 articles, treated of the public rights of the French people. It provided for the equality of all Frenchmen—a doctrine which it inherited from the Revolution, and which it unfortunately left to be understood in a sense inconsistent with monarchy, and indeed with any other form of government than pure democracy (see EQUALITY)—for their equal admissibility to all employments, civil and military, and for their freedom from arrest, otherwise than by legal process. It guaranteed the enjoyment of religious liberty, and the payment of the ministers of all Christian denominations—a privilege which in 1831 was extended even to Jews. The liberty of printing and publishing was insured, the censorship of the press and conscription were abolished, an amnesty for all political offences was proclaimed, and the security of property guaranteed, except when its sacrifice should be requisite for the public good, in which case it was declared that the owner must be indemnified. The 2d head set forth the nature and limitations of the kingly power in 8 articles. The supreme executive power, the command of the army and navy, and the right of making war, and treaties of peace, alliance, and commerce, were reserved to the monarch. To him, also, it belonged to nominate to all offices of public administration, to make all necessary regulations for the execution of the laws, but in no case to suspend them or dispense with them. The high duties of legislation were shared between the king, the Chamber of Peers, and the Chamber of Deputies; it being provided that every law should be agreed to by a majority of each chamber, and sanctioned by the king. Any one of the three branches of the legislature might originate any bill, except a money-bill, which was reserved for the Chamber of Deputies, as for the House of Commons in England. The 3d head contained ten articles regarding the Chamber of Peers, the nomination of whom was vested in the king (the princes of the blood being peers by right of birth). No limit was set to their number; but by the law of 9th December 1831, incorporated in the C., it was declared that their dignity should be for life only. The Chancellor of France was president. The Chamber of Peers assembled simultaneously with that of the Deputies, and its sittings were public. The personal privileges of the peerage, as they exist in England, were introduced. The 4th head concerning the Chamber of Deputies contains 16 articles. It provides for the election of the deputies and the sittings of the chamber. The electoral qualification is declared to be the payment of 200 francs of direct taxes, whilst that of a deputy is the payment of 500. The voting is by ballot, both at elections and in the chambers. The number of deputies, which at first was 430, was afterwards raised to 459. Each deputy was elected for five years, and one half of those for each department were required to have their political domicile within it. The C. became a nullity by the revolution of February 1848; and by the new constitution promulgated on the 4th of November of that year, the monarchy of France was converted into a democracy. By chapter 4 of that document, the legislative power was vested in a single assembly of 950 members, including the representatives of Algeria and the other colonies. The property electoral qualifica-

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tion was abolished, and the age reduced for electors to 21, and for delegates to 25. The period of three years was fixed for the continuance of the national assembly. By chapter 5, the executive power was intrusted to a citizen, who was to bear the title of President. He was not to be less than 30 years of age, his tenure of office was to be 4 years and he was not to be re-eligible until after an interval of 4 years. For an account of the subsequent changes by which these and the other arrangements adopted at the revolution of 1848 have since been superseded, see FRANCE.

CHA'RTER (Lat. *charta;* Gr. *chartes*, paper or anything writen upon, from *charasso*, to scratch or write). In its most general signification, C. is nearly synonymous with *deed* and *instrument*, and is applied to almost any formal writing, in evidence of a grant, contract, or other transaction between man and man. In private law, its most important use is in the alienation of real estates, the writing given to the new proprietor by the old, in proof of the transference title, being usually called a charter. In public law, the name is given to those formal deeds by which sovereigns guarantee the rights and privileges of their subjects, or by which a sovereign state guarantees those of a colony or other dependency. See CHARTE, MAGNA CHARTA. There is another sense of the term, in which it is in a measure intermediate between the the two we have mentioned—viz., where we speak of the C. of a bank or other company or association. In this latter sense it signifies an instrument by which powers and privileges are conferred by the state on a select body of persons for a special object. See BANK CORPORATION, JOINT-STOCK COMPANY, &c. The requisites of a C., when used in the first of these significations, according to the law of England, will be pointed out under DEED.

ROYAL CHARTERS, generally written in Latin, are of two kinds: I. Grants of lands, houses, honors, or liberties to persons who did not previously possess them; II. Charters confirming grants previously made, and therefore called "Charters of Confirmation." Confirmation charters are of three kinds. 1. Charters confirming previous grants, without reciting them; 2. Charters of simple confirmation, without addition of anything new; 3. Charters reciting previous charters and confirming them, with addition of something new. These last two classes of charters are called charters of "Inspeximus," or "Vidimus," from the word used by the granter in saying that he has seen the C. which he confirms. Royal charters generally contain seven clauses: 1. The "Premises," i. e., the name and style of the granter, the persons to whom the C. is addressed, the name and style of the grantee, the reason why the grant is made, and the description of the thing granted; 2. "The Tenendum and Habendum," i. e., the way in which the thing granted was to be held and had; 3. The "Reddendo," the return of rent or service which was to be made to the granter by the grantee; 4. The "Quare Volumus," or order that the grantee should have the thing granted, under certain penalties; 5. The "Sealing" or "Signature," clause, setting forth the seal, signature, or subscription by which the C. was authenticated; 6. The "Hiis Testibus," or testing-clause, enumerating the persons who were present as witnesses when the C. was granted; 7. The "Date," setting forth the time when, and the place where, the C. was granted.

CHARTER, in the law of Scotland, is the written evidence of a grant of heritable property, under the conditions imposed by the feudal law—viz., that the grantee, or person obtaining, shall pay at stated periods a sum of money, or perform certain services to the granter, or person conferring the property. A C. must be in the form of a written deed. The granter of a C., in virtue of the power which he thus retains over the property and its proprietor, is called the superior; and the grantee, in consequence of the services which he undertakes to render, the vassal; whilst the stipulated sum to be paid, or service to be rendered, is called the duty.

Charters are either blench or feu, from the nature of the service stipulated—*a me* or *de me*, from the kind of holding or relation between the granter and grantee; and original or by progress, from being first, or renewed, grants of the subjects in question.

Blench and Feu Charters —The duty which the superior required of his vassal in former times was almost always military service, and the vassal was then technically said "to hold ward"—to hold on condition of warding or defending his superior. But subsequent to the rebellion of 1745, in which the dangerous tendencies of the feudal relation were experienced, this holding was abolished (20 Geo. III.

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c. 50), and the only duties which it has since been lawful to insert in C. are *blench* and *su* duties. The former is a merely nominal payment—a penny Scots, a red rose, or the like, *si petatur tantum* (should it be asked); the latter is a consideration of some real value. Original blench C. having lost all object, and having no other effect but that of subjecting superiors to considerable expense in keeping up their titles, have become rare in modern practice. The forms of charters varying according to the circumstances in which they are granted, and the relations established between the granter and grantee, are of too technical a nature to admit of explanation in this work. They will be found very clearly and shortly stated in Bell's "Law Dictionary," voce "Charter."

CHARTER-HOUSE (a corruption of *Chartreuse*, i. e., Carthusian) is a hospital, chapel, and school-house, in London, instituted in 1611 by Sir Thomas Sutton, of Camps Castle, in the county of Cambridge. It had originally been a Carthusian monastery (founded in 1371 by a Sir Walter Manny and the Bishop of Sudbury), but on the dissolution of monastic establishments by Henry VIII., it was made a place of deposit for his nets and pavilions. After undergoing many alterations, and passing into the possession of various distinguished persons, it was finally purchased from Lord Suffolk, for £13,000, by Sir Thomas Sutton, who endowed it with the revenues of upwards of 90 manors, lordships, and other estates, in various parts of England. This "master-piece of Protestant English charity," as old Fuller calls it, serves three uses—it is an asylum for poor brethren, an educational and a religious institution; hence Bacon terms it a "triple good." The *poor brethren* are 80 in number. None are admitted under 50 years of age, and only these who have been housekeepers are eligible. Each brother has a separate apartment, a share of attendance from domestics, an ample, though plain diet, and an allowance of about £26 a year for clothes and other matters, and four weeks' holiday every autumn. The brethren must be bachelors and members of the Church of England. Among the poor brethren in by-gone years were Elkanah Settle, the antagonist of Dryden; John Bagford, the antiquary; Isaac de Groot, a descendant of Grotius; and Alexander Macbean, who assisted Johnson in the preparation of his Dictionary. The *scholars* are 44 in number, admissible between the ages of 10 and 14. They are understood to be "the sons of poor gentlemen to whom the charge of education is too onerous;" but, as in the case of the *poor brethren*, it is not always the proper parties who are chosen. There are exhibitions, scholarships, and medals competed for at certain times by the scholars. In addition to the scholars properly so called, i. e., such as receive free board and education, a large number of youths are sent to the C. school because of its reputation. These either board with the masters, or simply attend during the day. The number of extra boarders is nearly double that of the scholars. The institution is under the direction of the Queen, fifteen governors, selected from the great officers of state, and the master himself, whose salary from the foundation is £800 per annum. Among the eminent individuals educated in this establishment, are Dr Barrow, Judge Blackstone, Addison, Steele, John Wesley, Bishop Thirlwall, George Grote, W. M. Thackeray, and Sir Charles Eastlake.

The C., which is situated at the upper end of Aldersgate Street, is a quaint old building, interesting, though not very beautiful. The chapel contains Sutton's tomb, which was opened in 1842, when the body of the founder was discovered in a coffin of lead adapted to the shape of the body, like an Egyptian mummy-case.

CHARTER-PARTY (Fr. *chartre-partie*, so called from such documents being at one time divided—in Fr. *parti*—and one half given to each party concerned), the title given to a contract in which the owner or master of a ship, with consent of the owner, lets the vessel or a portion of her to a second party for the conveyance of goods from one port to another port; hence the vessel is said to be *chartered*. The document must be stamped. It must specify the voyage to be performed, and the terms on which the cargo is to be carried. On the part of the ship it is covenanted that she shall be sea-worthy, well found in rigging, furniture and provisions, and that the crew be suitable in number and competency; that she shall be ready to receive the cargo on a given day, wait its complete delivery for a certain period, and sail for the stipulated port when laden, if the weather for the time permits. The freighter's portion of the contract obliges him to load and unload at suitable periods

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under specified penalties, and to pay the freight as agreed on. The master must not take on board any contraband goods, or otherwise render the vessel liable to seizure The owner is not responsible for losses caused by war, fire or shipwreck, unless arising from negligence of the master or crew.

CHARTISM, a movement in Great Britain for the extension of political power to the great body of the people, arising in a great measure out of wide-spread national distress and popular disappointment at the results of the Reform Bill. Prior to 1831, the middle classes had sought popular aid towards obtaining their own enfranchisement. The assistance was given, the people expecting to receive help in their turn. After the passing of the Reform Bill, agitation ceased for a time, and the members returned to parliament were indifferent, or opposed, to any further change in the political arrangements of the country. The middle classes were satisfied with their own success, and generally looked with small favor on projects for the further extension of political influence among the masses. A season of commercial depression set in about 1835, and failing harvests for several years terribly increased the sufferings of the people. Food became dear, wages fell, manufactories were closed, work became scarce. The people associated their sufferings with their want of direct influence upon the government, and agitation for an extended franchise began. In 1838, a committee of 6 members of parliament and 6 workingmen prepared a bill, embodying their views as to what were just demands on the part of the people. This was the "People's Charter." It claimed—1. The extension of the right of voting to every (male) native of the United Kingdom, and every naturalised foreigner resident in the kingdom for more than two years, who should be 21 years of age, of sound mind, and unconvicted of crime; 2. Equal electoral districts; 3. Vote by ballot; 4. Annual parliaments; 5. No property qualification for members; and 6. Payment of members of parliament for their services. This programme was received with enthusiasm. Immense meetings were held all over the country, many of them being attended by two or three hundred thousand people. Fiery orators fanned the popular excitement, and under the guidance of the extreme party among their leaders, physical force was soon spoken of as the only means of obtaining justice. The most moderate and thoughtful of the Chartists were over-ruled by the fanatical and turbulent spirits, and the people, already aroused by suffering, were easily wrought into frenzy by those who assumed the direction of their movements. In the autumn of 1838, torchlight meetings began to be held. The danger of these meetings was obvious, and they were at once proclaimed illegal. Some of the more prominent leaders were arrested, amid intense popular excitement, and subjected to various terms of imprisonment. A body calling itself the National Convention, elected by the Chartists throughout the kingdom, commenced sitting in Birmingham in May 1839. It proposed to the people various means of coercing the legislature into submission, recommending, among other things, a run on the savings-banks for gold, abstinence from excisable articles, exclusive dealing, and in the last resort, universal cessation from labor. During its sittings, a collision took place with the military in Birmingham. Public meetings were forbidden, and alarming excesses were committed by the irritated mob. In June 1839, a petition in favor of the Charter was presented to the House of Commons signed by 1,280,000 persons. The House refused to name a day for its consideration, and the National Convention retaliated by advising the people to cease from work throughout the country. Fortunately, this advice was not followed, but the disturbance in the public mind increased, and in November, an outbreak at Newport took place, which resulted in the death of 10 persons and the wounding of great numbers. For taking part in this wild insurrection, three of its leaders were sentenced to death, but their punishment was afterwards commuted to transportation. In 1842, great riots took place in the northern and midland districts, not directly caused by the Chartists, but encouraged and aided by them after the disturbances began. In the same year, an attempt was made by Joseph Sturge to unite all friends of popular enfranchisement in a Complete Suffrage Union, but he only succeeded in dividing their ranks. In 1848, the turmoil in France created great excitement in England, and much anxiety was felt lest an armed attempt should be made to subvert the institutions of the country. Two hundred thousand special constables were enrolled in London alone. There were several local outbreaks, and much real danger, but the attempts at disorder were effic-

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iently met, and, as usual, the only result was the punishment of the more [illegible] men, and the postponement of the desired reforms.

Since 1848, C. has gradually died out. Its principles were not new. The Duke of Richmond, in 1780, introduced a bill into the House of Lords to give universal suffrage and annual parliaments. In the same year, Charles James Fox declared himself in favor of the identical six points which were afterwards included in the Charter. And nearer our own time, Earl Grey, Mr Erskine, Sir James Mackintosh, and many others, formed a "Society of Friends of the People," which aimed at obtaining a very large extension of the suffrage.

The great body of the Chartists were, however, not so much actuated by the weight of precedent or argument, as impelled by the pressure of actual want, and an indefinite feeling that the laws were somehow to blame for not providing them with the means of comfortable subsistence. But there were many among them who had studied the principles involved in their demands, and maintained them from an intelligent conviction of their truth. These men declared that all persons had an equal natural right to share in determining the laws under which they lived; and further, that as they were required to contribute to the taxation of the country, they were justly entitled to be heard as to the application of the public funds. Taxation and obedience being universal, representation ought to be so. This view being conceded, all the other points of the Charter naturally followed, they being merely arrangements for securing the free action of the right contended for. Some of the Chartist advocates went far beyond this. There were those among them whose aims included little less than the reorganisation of society. One of the ablest advocates of the cause wrote in favor of nationalising the land, and remodelling the currency; he also proposed a system of state loans for the assistance of laborers who desired to become capitalists, and national marts for the exchange of wealth on terms of equity and justice. Pressed a little further, these views would have developed into Communism; but so far as we are aware, most Chartists held so strongly the doctrine of *individual* rights, that they were not likely to subordinate *man* to *society*. See COMMUNISM, SOCIALISM. The object aimed at by the majority, was merely the extension of the franchise to the masses, in the belief that they would use it wisely and honestly, and put an end to what they considered the selfish and interested rule of classes who had long monopolised the control of the state. The opponents of C. answered, that if the question was argued as one of right, it would go far beyond the conclusions which the Chartists had reached. The *right* appertained to women as well as to men, and there was no just reason why sane persons under 21 should be deprived of it. It would also, they maintained, give all power to the most ignorant classes of the community, and thus subject intelligence to brute force. Government existed for the benefit of society, and ought, as far as possible, to depend on the wisdom, and not on the mere number of the people. Then if representation depended upon taxation, it should vary in proportion to the taxes paid. Finally, they denied that men *as such* had a right to vote; their right was to be well governed, and universal suffrage was more likely to destroy society than to confer happiness or insure justice.

The cause which put an end to C. as an organisation was undoubtedly the improvement in the circumstances of the people, which followed the repeal of the Corn Laws. Since then, the chief points of the Charter have actually become law. A property qualification is no longer necessary in a representative; the reform acts of 1867—1868 have virtually established manhood suffrage; and the act of 1872 gave vote by ballot. The efforts of the majority of those who live by manual labor are now directed towards securing, by trades-unions and other means a larger share than formerly in the profits of industry.

CHARTRES, a city of France, in the department of Eure-et-Loir, 47 miles southwest of Paris, is built partly at the base and partly on the declivity of a hill overlooking the river Eure, which is here divided into two channels, one flowing within and the other without the ramparts, which are converted into agreeable promenades. C. consists of an upper and lower town, connected by streets almost inaccessible to carriages. The upper town has some good streets, but the lower is ill built. The houses are old, and many of them composed of wood, with their gables to the street. The cathedral, one of the largest and most imposing ecclesiastical structures in

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Europe, with its lofty spires, one of them towering to a height of more than 400 feet, crowns the top of the hill. It has no less than 130 painted-glass windows, the workmanship of which is unsurpassed, if indeed equalled elsewhere in France. The church of St Pierre, and the obelisk to the memory of General Marceau, are also objects of interest. The weekly corn-market of C. is one of the largest in France, and is remarkable as being under a corporation of women, who contrive to get through all the business most satisfactorily in less than an hour. It has manufactures of woollen, hosiery, and leather. Pop. (1872) 16,977.

C. is a very ancient city. Under the Roman rule it was called *Autricum*, and remains of Roman antiquity are still found.

CHARTREUSE, La Grande, a celebrated monastery in France, in the department of Isère, situated 13 miles north-north-east of Grenoble, in the wild and romantic valley of the Guiers, nearly 4000 feet above the sea. It surrounded by the mountain-forests of the Alps; and the route to it, through a mountain-gorge, down which a rapid river dashes far below the traveller, while above him rise precipitous and foliage-lined rocks, some hundreds of feet in height, is one of the most picturesque. The convent is a huge ungainly structure, dating mostly from the 17th c., earlier buildings having been destroyed several times by fire. The convent owes its origin to St Bruno, who settled a little higher up the mountain in 1084, giving the name of the place, C., to his order. The monks had at one time considerable property, but they were despoiled at the revolution of 1789.

CHA'RTULARY (Lat. *chartularia, chartologia*) is, as its name implies, a collection of charters. So soon as any body, ecclesiastical or secular, came to be possessed of a considerable number of charters, obvious considerations of convenience and safety would suggest the advantage of having them classified and copied into a book or roll. Such book or roll has generally received the name of a Chartulary. Mabillion traces chartularies in France as far back as the 10th c., and some antiquarics think that chartularies were compiled even still earlier. But it was not until the 12th and 13th centuries that chartularies became common. They were kept not only by all kinds of religions and civil corporations, but even by private families. Many of them have been printed, and their contents generally are of the greatest value in all historical, archæological, and genealogical inquiries.

CHARY'BDIS. See SCYLLA AND CHARYBDIS.

CHA'SCHISH. See HEMP, INDIAN.

CHASE. When one vessel is pursuing another at sea, the pursued vessel is often called the *chase*, and the pursuer the *chaser*. The manœuvre also gives name to certain guns on board ship; a *bow-chaser* being a gun pointing ahead, and a *stern-chaser* pointing astern.

CHASE, in a gun, is the name given to the greater portion of the length between the muzzle and the trunnions.

CHASIDIM ("Pietists"), this name anciently denoted a whole class of Jewish sects. After the Babylonish captivity, the Jews, with regard to their observance of the law of Moses, were divided into two classes—*Chasidim* and *Zadikim*. When the so-called Great Synagogue was commissioned by the Persian government to draw up a code of civil and religious laws for the emigrant Jews returning to settle in their native land, several innovations were made on the Mosaic law. Those who accepted these innovations were styled the C.; while those who rejected them were styled, or styled themselves, the Zadikim, or "upright," because they adhered strictly to the law given by Moses, without observing any of the additions made to it. The C. branched forth into several sects, all holding traditions in connection with the written law, which they believed to possess a divine sanction equally with that law. The Pharisees, so often mentioned in the New Testament, formed an early sect among the C., while from the Zadikim sprang forth the Hellenistic Samaritans, Essenes, Sadducees, &c. Afterwards, the C., or Pharisees, split into Talmudists, Rabbinists and Cabbalists, some of whom underwent still further subdivision.—The modern C. are not, like those in the times of the Maccabees, marked by any peculiar spiritualistic tendency in religion, but rather by a strict observance of certain traditional forms, and a blind subservience to their teachers.

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Their doctrine was promulgatad in the middle of the 18th c. by Israel of Podolia, called *Baal-Shem* ("Lord of the Name," so called because he professed to perform miracles by using the great cabalistic name of the Supreme Being.) Though condemned by the orthodox rabbis, this new teacher had great success in Galicia, and when he died (1760) left 40,000 converts. They are now broken into several petty sects; their religion is utterly formal, and its ceremonies are coarse and noisy.

CHASING, the art of working raised or half-raised figures in gold, silver, bronze, or other metal. It was called *cœlatura* by the Romans; and the term is expressly limited by Quintilian to working in metal. The same art when exercised on wood, ivory, marble, precious stones, or glass, was called *sculptura*. See CARVING. Iron was sometimes, though rarely used, silver having been always the favorite metal for this purpose. Closely connected with, but still distinguished from C., is the art of stamping with the punch, which the Romans designated by *excudere*. The Greek *toreutike* is usually supposed to correspond to C., but the point is by no means free from dispute. The art was known at a very early period, as may be inferred from the shield of Achilles, the ark of Cypselus, and other productions of the kind. Such portions of the colossal statues made by Phidias and Polycletus, as were not of ivory, were produced by the toreutic art. The statue of Minerva was richly adorned in this manner. Besides Phidias and Polycletus, Myron, Mys, and Mentor were celebrated toreutic artists in antiquity, and amongst many moderns the most famous is Benvenuto Cellini (q. v.).

CHASSE, music composed in imitation of the chase, and performed chiefly by horns, occasionally combined with other wind-instruments. Its movement is in $\frac{6}{4}$ time. The best specimens of this kind of music are an overture by Mehul, and a C. for the pianoforte by Kreutzer.

CHASSÉ, David Hendrik, Baron, was born in Tiel, March 18, 1765, began his military career when but ten years of age, became a lieutenant in 1781, and captain in 1787. After the revolution of that year, C., as siding with the humbled Dutch patriots took French service; was appointed lieutenant-colonel in 1793; and, two years later, found himself marching towards the Netherlands under the command of Pichegru. He afterwards fought with the French in Germany and Spain, gaining great distinction and the appellation of *Général Bayonnette*. As lieutenant-general of the Dutch forces in 1815, C. added to his laurels on the field of Waterloo. After the peace he was made governor of Antwerp in 1830, and bravely defended it against the united Belgians and French from November 29 till December 28, 1832, when he was forced to surrender. He died in May 1849.

CHASSEURS (Fr., hunters) is a name used for two important forces in the French army. The mounted C. (*C.-à-cheval*) are a body of light cavalry, designed for service in advance or on the flanks of the army, and correspond most nearly to the light horse of the British service. The name is first used in this sense in 1741, and has been retained while the force it denotes has undergone many alterations in organisation and equipment. In 1831 a body of cavalry was raised for service in Africa, mounted on Arab horses, and with a distinct uniform. These have since become famous as the *C. d'Afrique*. After the reorganisation of the French army in 1873, the effective army contained 14 regiments (subsequently increased to 20) of C.-à-cheval, besides 4 regiments of C. d'Afrique.—The infantry C. (*C.-à-pied*) are a light infantry force in many respects corresponding with the cavalry C., and like them intended for detached service (like the Rifle Corps in the English army). The French are believed to have adopted the idea of such a force of sharpshooters from *Jäger* (the German word corresponding to C. or *hunters*) in the German armies. First used in the Thirty Years' War, the Jäger derived their name from the fact that they were chiefly drafted from amongst mountaineers and inhabitants of forest regions. They have always been regarded as a valuable contingent in the Prussian and Austrian armies, or even constitute the entire force of light infantry. In the German army, there are 26 battalions (near 15,000 men) of this force; in the Austrian service, upwards of 20,000 officers and men. In France the equipment of the C. differed little from that of the other infantry; it was not until the formation in 1833 of the *C. de Vincennes*, that the experiment of a specially armed force of sharpshooters was fairly tried. The fame of the C. de Vincennes for rapidity and precision of movement, as well as for the accuracy of their fire, soon vindicated the im-

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portance of this branch of the infantry; and at present there are 30 battalions of C.-à-pied in the French army.

CHASTE TREE. See VITEX.

CHASUBLE (Lat. *casula*, *casubula*, and *casibula*), the uppermost garment worn by priests in the Roman Catholic Church when robed for the celebration of the mass. It was called also "the Vestment," and under that name seems occasionally to have been used in the English Church after the Reformation. Originally it covered the priest from head to food, like a little house, whence some writers think it had its name of *casula*. In more recent times, at least, it was made of velvet. It was of an elliptical shape, like a *vesica piscis*, with a hole in the middle for the head; it had no sleeves. When put on it shewed two peaks, one hanging down before another on which a cross was embroidered, hanging down behind. According to Hildebert, the C. signified good works; according to Alcuin, charity; according to another writer, the unity of the faith. Durand makes one peak the symbol of love to God, the other peak the symbol of love to our neighbor. In France, the press or wardrobe in which chasubles were kept was called the *chasublier*.

CHAT (*Saxi'cola*), a genus of small birds of the very numerous family *Sylviadæ* (q. v.), distinguished by a bill slightly depressed and widened at the base. They have rather longer legs than most of the family. They are lively birds, flitting about with incessant and rapid motion in pursuit of the insects on which they chiefly feed. They are found in Europe, Asia, Africa, and New Holland. Three species are British—the stonechat, winchat, and wheatear.—The yellow-breasted C. of the United States (*Icteria polyglotta*) is a larger bird, and belongs to the family *Turdidæ* or *Merulidæ*.

CHAT MOSS, a bog in Lancashire, the largest in England, about 7000 acres in extent, and celebrated as having been the scene of the first great and successful efforts for the reclaiming of bogs, by Mr. Roscoe of Liverpool, in the end of the 18th and beginning of the 19th c., and of one of the great engineering triumphs of George Stephenson in the construction of the Liverpool and Manchester Railway. It is situated between Liverpool and Manchester, at no great elevation above the sea. It is from 20 to 30 feet in depth, and of such consistence that when an attempt was first made to survey it for the Liverpool and Manchester Railway, the attempt was relinquished because of the impossibility of obtaining a sufficiently solid stand for the theodolite. Drains are filled up almost as fast as they are cut, by a pulpy stuff flowing into them, and affect only a few feet on either side. Great danger is experienced by any person stepping unwarily on the surface of the bog; and when he begins to sink, his struggles to extricate himself only cause him to sink faster and deeper. Mr Roscoe's agricultural improvements were effected by numerous parallel drains in the parts on which he operated. The use of *pattens* by his workmen, and the adaptation of them to the feet of the horses employed, have been mentioned in the article Bog. The enlargement of the circle upon which a horse's foot rests from 5 inches diameter to 7, nearly doubles it, and consequently diminishes nearly by one-half the pressure on each unit of surface. Mr Stephenson, when he could find no one to countenance him in his views, calculated with confidence on the application of this principle to the railway, so that even the ponderous locomotive and train might be supported by a sufficient extension of the bearing surface; and this he accomplished by spreading branches of trees and hedge-cuttings, and in the softest places rude hurdles interwoven with heather, on the natural surface of the ground, containing intertwined roots of heather and long grass; a thin layer of gravel being spread above all, on which the sleepers, chairs, and rails were laid in the usual manner. Drains were at the same time cut on both sides of the line, and in the central part of the moss a conduit was formed beneath the line of railway, of old tar-barrels placed end to end. Notwithstanding difficulties which every one but himself deemed insuperable, Mr Stephenson constructed the portion of the line through C. M. at a smaller expense than any other part of the railway. There still is "a sort of springiness in the road over the moss, such as is felt when passing along a suspension bridge;" and "those who looked along the moss as a train passed over it, said they could observe a waviness, such as precedes and follows a skater upon ice."

The complete reclaiming of C. M. for agricultural purposes can be only a ques-

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tion of time and expense. It seems capable of becoming one of the most productive tracts of land in England.

CHÂTEAU, Châtel, or Castel, from the Lat. *castellum*, a fort, enters as a component part into many names of places in France.

CHATEAUBRIAND, François Auguste, Vicomte de, one of the most distinguished of French authors, was born September 4, 1769, at St. Malo, in Bretagne, and received his early education in the college at Rennes. While travelling in North America in 1790, he accidentally read in an English newspaper the account of the flight and arrest of Louis XVI. He immediately returned to France, intending to fight against the republic; but being seriously wounded at the siege of Thionville, in September 1792, he escaped to England, where he lived in such poverty that he was compelled to make translations for the booksellers, and to give lessons in French. In 1797, he published his first political essay, "Sur les Révolutions Anciennes et Modernes, considérées dans leurs Rapports avec la Révolution Française" (2 vols., London), a republican and sceptical work, the outcome of hardship, poverty, and sorrow. His scepticism soon vanished, but republican impulses continued to flash out at intervals during the whole of his strangely checkered, inexplicable, and inconsistent career. In 1800, C. returned to Paris, and wrote for the "Mercure de France." In this journal, he first printed his tale of "Atala" (1801), with a preface lauding the First Consul, Bonaparte. Its success was remarkable, but nothing to the miraculous enthusiasm excited by his "Génie du Christianisme" (1802), a work exactly suited to the jaded scepticism of the age, and also in accordance with the policy of the First Consul, who was then concluding the concordat with the pope, and wished to make the Roman Catholic priesthood subservient to his measures. Bonaparte, therefore, appointed C. secretary to the embassy in Rome, and, in 1803, sent him as ambassador to the little republic of Valais. On the execution of the Duke d'Enghien, March 21, 1804, C. resigned in disgust. In 1806, he commenced his pilgrimage to the Holy Land, visited Greece, Palestine, Alexandria, and Carthage, and returned through Spain to France in May 1807. From this period to the fall of Napoleon, he lived privately, publishing only two works of any value—"Les Martyrs," and the "Itinéraire de Paris á Jérusalem." In 1814, his eloquent brochure, "De Bonaparte et des Bourbons," excited such attention, that Louis XVIII. declared it was worth an army of 100,000 men in favor of legitimacy.

After the battle of Waterloo, C. returned to Paris, where he was made peer and minister of state. Gradually his monarchical zeal subsided, and, in his address, "De la Monarchie selon la Charte," delivered in the Chamber of Peers, he gave expression to such liberal tendencies as offended the king, who erased his name from the list of his counsellors. Soon, however, he appeared again as an ultra-royalist; and at the baptism of the infant Duke de Bordeaux, C. presented to the Duchess of Berry a flask filled with water from the Jordan. In 1822, he was appointed ambassador-extraordinary to the British court, but was rather rudely dismissed from office in 1824.

In 1826, C. prepared the first edition of his collected works, for the copyright of which the publisher gave the large sum of 600,000 francs, of which C. returned 100,000. During the days of July 1830, he was staying with his friend Madame Récamier at Dieppe; but as soon as he heard tidings of the revolution, he hastened to Paris. He refused to take the oath of fealty to Louis Philippe. This political crotchetiness, which always rendered it impossible to know beforehand what course of conduct C. would adopt, is perhaps best explained by the following passage from his "De la Restauration et de la Monarchie Elective" (Paris, 1831): "I am a Bourbonist in honor, a Monarchist on grounds of rational conviction; but in natural character and disposition, I am still a Republican." In 1832, he revised a new edition of his works, and, after visiting the court of the expelled Bourbons, devoted his attention to the preparation of his memoirs, intended to be published posthumously ("Mémoires d'outre Tombe,") though considerable extracts were printed during his lifetime. He also found leisure to write several other works. He died July 4, 1848.

C. wrote with warmth, energy, and a rich supply of imagery. Many of his descriptive passages are excellent, but his ideas want depth and coherency.—Marin, "Histoire de la Vie et des Ouvrages de M. de Chateaubriand" (2 vols., Paris, 1833).

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CHÂTEAUDUN, a town of France, in the department of Eure-et-Loir, is situated on the Loir, a tributary of the Loire, about 26 miles south-south-west of Chartres. The streets are straight and well built, and an old castle, with an enormous tower, overlooks the town. C. has manufactures of blankets and leather. Pop. (1872) 5564.

CHÂTEAU-GONTIER, a town of France, in the department of Mayenne, situated on the river of that name, here crossed by a stone bridge, 18 miles south-south-east of Laval. C. has some good houses, but the streets are not well laid out. It has linen and woollen manufactures. Pop. (1872) 6371.

CHÂTEANNEUF DE RANDON, a village of France, in the department of Lozère, 12 miles north-east of Mende. A pretty historical incident connected with the place, which was formerly fortified, makes it interesting. In 1380, the fortress, then held by the English, was besieged by the troops of Charles V., under the command of the gallant Du Guesclin. The English governor, sore pressed, promised to yield in fifteen days if no succor arrived. In the meantime, Du Guesclin died, and his successor was appointed, who, at the expiry of the fifteen days, summoned the governor to surrender. He refused to yield up the keys to any but Du Guesclin; and when informed of his death, marched out, and on bended knee laid the keys and his sword on the dead hero's bier. Pop. (1872) 393.

CHA'TEAUROUX, a town of France in the department of Indre, situated on a rising ground in the midst of an extensive plain, on the left bank of the river Indre, 166 miles south of Paris by railway. The town, which was formerly dirty and ill built, has been greatly improved within the last quarter of a century. C. does not possess much interest for the traveller. It is a busy place, with extensive woollen factories, besides manufactures of cotton, hosiery, yarn, hats, paper, parchment, hardware, leather, &c. Some of the best iron in France is found in the vicinity. The town owes its origin to a castle built here in the 10th century. Pop. (1872) 14,893.

CHA'TELET-LOMONT, Gabrielle Emilie, Marquise du, a very learned French woman, notorious for her intimacy with Voltaire, was born at Paris, 17th December 1706. At an early period she displayed a great aptitude for the acquisition of knowledge. She studied Latin and Italian with her father the Baron de Breteuil, and subsequently betook herself with zeal to mathematics and the physical sciences. Distinguished alike for her beauty and talent, she soon found a host of suitors for her hand. Her choice fell on the Marquis du Châtelet-Lomont, but her marriage did not hinder her from forming a *tendresse* for Voltaire, who came to reside with her at Cirey, a château on the borders of Champagne and Lorraine, belonging to her husband. Here they studied, loved, quarrelled, and loved again, for several years. In 1747, however, poor Madame C. became "not insensible to the brilliant qualities" of a certain M. Saint-Lambert, a captain of the Lorraine Guards; and the result was, that the philosopher had to make room for the soldier, and content himself for the future with being the "devoted and indulgent friend" of his former mistress. This new intimacy became fatal to Madame Châtelet. She died at Luneville, 10th September, 1749, a few days after having given birth to a child. Her first writing was a treatise on the philosophy of Leibnitz. She also translated the "Principia" of Newton into French, accompanying it with algebraic elucidations. It did not, however, appear till 1756, some years after her death. Her correspondence with Voltaire is interesting; but the fact that a woman so highly gifted as Madame C., and possessing so many amiable qualities, should never have dreamed that there was anything wrong in her *liaisons*, proves with terrible conclusiveness how corrupt was that philosophic society which, in the 18th c., professed to explode superstition and enlighten France and the world.

CHÂTELLERAULT, a town of France, in the department of Vienne, situated on the river of that name, 18 miles north-north-east of Poitiers. A handsome stone bridge, with a massive castellated gateway, built by Sully, at one end, connects it with a suburb on the other side of the river. C., which is an ill-built, mean-looking town, is one of the chief seats of the manufacture of cutlery in France, and since 1820 has had a national manufactory of swords and bayonets. Its river-port makes it the entrepôt for the produce of an extensive district. The

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Duke of Hamilton derives his title of Duke of Châtellerault from this place. Pop (1872) 13,019.

CHATHAM (Saxon, *Cetcham* or *Cættham*, understood to signify the "village of cottages"), a parliamentary borough, river-port, fortified town, and naval arsenal, in the county of Kent, situated on the right bank of the Medway, at the upper part of its estuary, 30 miles east-south-east of London. Much of C. is ill built and irregular. The High Street is 1¼ mile long, parallel to the river, and swarms with soldiers and Jews. The refuse timber of the dock-yard is much used in building the house-walls. C. owes its importance to its naval and military establishments situated at Brompton village (on a height half a mile north of C.), and on the Medway estuary. The C. fortified lines are the frequent scenes of field operations, imitation battles, and grand reviews. Pop. (1871) 45,792. The borough, which sends one member to parliament, is governed by a head-constable under the magistrates of Rochester. The Romans seem to have once had a cemetery here. Traces of Roman villas have been found, with Roman bricks, tiles, coins and weapons. The dock-yard was founded by Elizabeth before the threatened invasion of the Spanish Armada. In 1662, it was removed to its present site. In 1667, the Dutch under De Ruyter, sailed up the estuary of the Medway, and in spite of the fire from the castle, destroyed much shipping and stores.

In a military point of view, the lines of detached forts connected with C. constitute a fortification of great strength; and the whole is regarded as a flank defence for London in the event of an invader seeking to march on the capital from the south coast. The place is also defended by some strong forts on the Medway. In and near C. are Fort Pitt, a military hospital and strong fort; barracks for infantry, marines, artillery, and engineers; a park of artillery; and magazines, store-houses, and depôts on a large scale.

In a naval sense, C. is one of the principal royal ship-building establishments in the kingdom, and a visit to it never fails to impress the stranger with a sense of the naval power of England. The dock-yard is nearly two miles in length, containing several building-slips, and wet docks sufficiently capacious for the largest ships; and the whole is traversed in every direction by a tramway for locomotives, with a guage of 18 inches. One peculiar establishment in this dockyard is a metal mill, which supplies all the royal dock-yards with copper sheets, copper bolts, and other articles in copper and mixed metal. The saw-mills at C. are so extensive, that it is said that, if fully employed, they could cut up timber enough for all the dock-yards. A duplicate of Brunel's block-making machinery is kept at C., ready to supplement the operations of that at Portsmouth. The dock-yard is under the control of a captain-superintendent, and other officers, whose annual salaries vary from £700 to £300 each. Under them are clerks receiving from £450 to £80 each. The actual workmen, artizans and laborers, vary in number according to the amount of ship-building and repairing going on. In the estimates for 1876—1877, provision was made for 3500 ship-wrights, calkers, joiners, sawyers, mill-wrights, smiths, block-makers, sail-makers, rope-makers, riggers, laborers, &c., the sum estimated for wages amounting to £219,472.

CHATHAM ISLANDS, a small group in the Pacific, lying about 400 miles due east of the Canterbury settlement, on the Middle Island of New Zealand, in lat. 43° 38'—44° 40' s., long. 177°—179° w., being thus almost precisely the antipodes of Toulouse, in France. They were discovered in 1791 by Lieutenant Broughton, both the cluster and its chief member taking the name of his ship. Chatham Island is computed to contain 600,000 acres; a salt or brackish lake, however, of 20 miles in length, occupying the interior. The soil and climate of the archipelago, in general, are said to be good. Wheat yields abundantly; and the horses, cattle, and pigs which have been introduced thrive well. Timber of any size is unknown, so that the native canoe, instead of being cut out of a single tree, is merely wicker work bound together by cordage of indigenous flax. The aborigines have two missions among them—one from Germany, and the other from New Zealand.

CHATHAM, William Pitt, Earl of, sometimes styled Pitt the Elder, one of the greatest English orators and statesmen of the 18th c., was the son of a country gentleman, Robert Pitt of Boconnoc, in Cornwall; and was born November 15, 1708. After an education at Eton and Oxford, he travelled on the continent, and on

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his return obtained a cornetcy in the Blues. In 1735, he entered parliament for Old Sarum—that synonym for electoral corruption—a borough then belonging to his family. He espoused the side of Frederick Prince of Wales, then at deadly feud with the king, and offered a determined opposition to Walpole, who was at the head of affairs. He was deprived of his commission in consequence—an insult and injury which only increased the vehemence of his denunciations of the court and the government. His influence, both in and out of the House of Commons, increased rapidly; and Walpole being driven from power, the king, notwithstanding his hatred of Pitt, found it necessary to allow of his admission to a subordinate place in the Broad Bottom administration; subsequently he was appointed to the lucrative office of paymaster-general. The Duchess of Marlborough, pleased with his patriotism and powers of oratory, left him £10,000; and later Sir William Pynsent, struck with similar admiration, left him his whole property. In 1755, when Henry Fox (afterwards Lord Holland) was made secretary of state, finding himself opposed to the foreign policy of the new minister, Pitt resigned office as paymaster. In the following year, when the king, unwillingly acceding to popular demands, had to dismiss Fox, Pitt became nominally secretary of state, but was virtually premier. He immediately began to put into execution his own plan of carrying on the war with France. He raised the militia and strengthened the naval power; but the king's old enmity, and German predilections led him to oppose Pitt's policy, who thereupon resigned office in April 1757, but was recalled in June, in obedience to the loud demands of the people.

Now firmly established in power, Pitt's war policy was characterised by unusual vigor and sagacity. Success returned to the British arms. French armies were beaten everywhere by Britain and her allies—in India, in Africa, in Canada, on the Rhine—and British fleets drove the few French ships they did not capture or destroy from almost every sea. But the prime mover of all these brilliant victories found himself compelled to resign (1761), when, on the accession of George III., and owing to the influence of Lord Bute, it was attempted to introduce a vacillating policy into the government; his immediate cause of resignation being the refusal of the majority of the cabinet to declare war with Spain, which Pitt foreseeing as imminent, wished to commence before the Spaniards were thoroughly prepared. As some recompense for his important services, Pitt received a pension of £3000 a year; and his wife, sister of George Grenville, was created Baroness Chatham. Until 1768, Pitt remained out of office, not offering a factious opposition to government, but employing all his eloquence to defeat some of its most obnoxious measures. In that year he received the royal commands to form a ministry. He undertook the task, choosing for himself—to the astonishment of the public, and the sacrifice, to a considerable extent, of his popularity—the almost sinecure office of Privy Seal, with a seat in the House of Lords as Viscount Pitt and Earl of Chatham. Ill health prevented C. from taking any active part in this ministry, of which he was nominally the head, and which was weak and embarrassed throughout, and he resigned in 1768, to hold office no more. He did not, however, cease to take an interest in public affairs. He spoke strongly against the arbitrary and harsh policy of government towards the American colonies, and warmly urged an amicable settlement of the differences. But when, America having entered into treaty with France, it was proposed by the Duke of Richmond to remove the ministers, and make peace on any terms, C., though much debilitated, came down to the House of Lords, and in a powerful address protested against the implied prostration of Britain before the throne of the Bourbons, and declared war, with whatever issue, preferable to the proposed terms of peace. This address secured a majority against the motion, and the war was continued. But it was the orator's last effort; for, exhausted by speaking, on rising again to reply to a query addressed to him by the Duke of Richmond, his physical powers suddenly failed, he fell back into the arms of his friends, and was carried from the House. He died May 11, 1778. He was honored with a public funeral in Westminster Abbey, where a statue was also erected to his memory at the public expense; and in addition, government voted £20,000, to pay his debts, and conferred a pension of £4,000 a year on his descendants. C.'s personal appearance was dignified and imposing, and added greatly to the attractions of his oratory, which was of the most powerful kind. His upright and irreproachable character demanded the admiration

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of his enemies; but his affectedness and haughtiness not unfrequently disgusted his friends, and pride rather than principle seems to have actuated his course at some important conjunctures of life. He had, however, an intense love of country; the grand object of his ambition being to make his native land safe against all contingencies, and powerful among nations.

CHÂTILLON, a town of France in the department of Cote d'Or, on the Seine, about 45 miles n. n. w. of Dijon. Pop. (1872) 4586. C. is chiefly famous on account of the congress of allied sovereigns held here in 1814, from February 5 to March 19, for the purpose of negotiation with Nepoleon respecting conditions of peace. Several of the conditions proposed by the allies Napoleon could not bring himself to submit to, and the negotiations broke up March 19. On the 25th, when their armies were in fact marching on Paris, the allies from Vitry issued their declaration justifying a continuation of the war.

CHATSK, or SCHAZK, a town of European Russia, government of Tambov, 175 miles south-east of Moscow, on a small river of the same name. It is situated in the midst of a vast fertile plain, contains a number of churches, and has a trade in hardware, grain and cattle. Pop. (1867) 6733.

CHA'TSWORTH, the magnificent mansion of the Duke of Devonshire, and one of the most splendid private seats in England, is situated in Derbyshire on the Derwent, 12 miles north by west of Matlock. William the Conqueror gave the domain to his natural son, William Peveril. It was purchased by Sir W. Cavendish in Queen Elizabeth's time. Sir W., in 1570, began the old mansion, which was finished by his widow, afterwards Countess of Shrewsbury. In this building, Mary Queen of Scots was imprisoned for 13 years. The present edifice, called a palace from its grandeur, includes the old Ionic pile, 183 by 172 feet, built 1687—1706, by the first Duke of Devonshire, after designs by Talman and Wren. The great stables were built about 1706, and the north wing since 1720. The façade is 720 feet long, or with the terraces, 1200 feet. The building is nearly a square, with an interior court. C. is famed for its pictures, sculptures, hanginge, carvings, and bas-reliefs. There are some exquisite sculptures by Canova, Thorwaldsen, Chantrey, &c. The gounds around are 9 miles in circuit, including hill and dale, and fine prospects. They were laid out by London and Paxton, and are celebrated for their trees, shrubs, rock-work, deer, and water-works—only surpassed by those at Versailles. The conservatory, unrivalled in Europe, covers nearly an acre, measures 300 by 145 feet, and 65 feet high, has 70,000 square feet of glass, and a carriage-road through it. Hobbes, the philosopher, lived long at Chatsworth.

CHATTAHOO'CHEE, a river of the United States, rises on the eastern declivity of the Blue Ridge of the Alleghanies, in the north of Georgia; traverses that state in a south-west direction; becomes the boundary between it and Alabama; and finally, after receiving the Flint from the left, crosses Florida, under the name of Appalachicola, into the Gulf of Mexico. With an entire course of 550 miles, it is navigable upwards as far as Columbus, at a distance of 350 miles from the sea. It forms the principal outlet for the cotton crops of its basin.

CHA'TTEL (Fr. *chatel*, Old Fr. *chaptel*, from Lat. *capitale*, corrupted into *captale* and *catallum*, meaning the capital or principal sum in a loan; hence goods in general, especially cattle, as distinguished from land), in the law of England, is a term used to designate any kind of property which, with reference either to the nature of the subject or the character of the interest possessed in it, is *not freehold*. Regarded from a positive point of view, C. included not only all movable property, but all property which, though immovable, was not held on a feudal tenure. Any estate, then, or interest in lands and tenements not amounting to freehold, is a chattel. But as, between property thus "savoring of reality" and mere personal movables—money, plate, cattle, and the like—there was a manifest distinction, chattels were, consequently, distinguished into *chattels real* and *chattels personal*. Both descriptions of C., in the eye of the ancient law of England, were regarded as inferior to freehold, and formed a subordinate class of property. As distinguished from estates of inheritance, or for life in things immovable, such estate is called *personal*, the others being *real* estate. Till the passing of 8 and 9 Vict. c. 106, livery of seisin was required to pass an estate of inheritance, or for life

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in corporal hereditaments of feu tenure, but such was no more required for the transfer of a C. real than of a C. personal. A C. *real* is also transmitted on the owner's death to his executor or administrator, like a C. personal, and does not descend to his heir like a freehold of inheritance. There is an exception to this rule, however, in the case of chattels which, owing to their intimate connection with property of a freehold nature, cannot be separated from it without injury. Such for instance, are the muniments of title to an estate, growing grass, deer in a park, and actual fixtures, all of which go to the heir, and not the executor. The tenant of a C. real, like the tenant of a C. personal, is, moreover, said not to be *seized*, like the tenant of a freehold, but to be *possessed*. Lastly, there can be no estate tail in a C. real more than in a C. personal, except in the case in which either of them can be regarded as an heir-loom. Formerly, C. might be disposed of by will at an earlier age than real estates, but this was altered by 1 Vict. c. 26.

CHA'TTERER, a significant popular name, often applied to the birds of the family *Ampelidæ*, a family of the order *Insessores* and tribes *Dentirostres*, having a depressed bill like that of the Fly-catchers (*Muscicapidæ*), but somewhat shorter and broader in proportion, and slightly arched. To this family belong the cotingas, wax-wings, piauhaus, caterpillar-hunters, &c. They are found chiefly in the warmer parts of the old world, although America also produces some. They inhabit low grounds or forests, feeding chiefly on insects and their larvæ. Some of them possess powers of song almost equal to those of the nightingale. Many of them are birds of gorgeous plumage.—Only one species is British, sometimes called simply the C., sometimes the Bohemian C. or Wax-wing (q. v.).

CHA'TTERTON, Thomas, an English poet, whose youth, genius and tragical death have made him one of the wonders of English literature, was born in Bristol, November 20, 1752. His father, who had once been a chanter in the Bristol cathedral, and also master of a kind of free-school, died two or three months before the poet's birth. C. was educated at a parish-school, was considered a dull child, but making acquaintance with a black-letter Bible which his mother often used, the dormant spirit flashed up. From early years, he was fond of all kinds of antiquities; he clung around old walls like the ivy, and haunted twilight ruins like the bat. At the age of 14, he was apprenticed to Mr Lambert, an attorney. His situation here was uncomfortable, he took his meals in the kitchen with the footboy, and when refractory, was chastised with a ruler. In October 1768, the new bridge at Bristol was opened, and C. sent to a newspaper an account, in antique phraseology and spelling, of the ceremonies attending the opening of the old one several centuries before—the whole purporting to be taken from an ancient MS. To a certain Bristol pewterer, Burgum by name, he presented himself, and astonished the craftsman by the sight of a parchment, in which his pedigree was traced back to the Norman conquest, adorned by many a splendid marriage, and many a knightly name. He also exhibited to his friends copies of old poems, which he said were composed by one Thomas Rowley, a monk of the 15th century. These matters made some stir in his native city, but not enough to satisfy C., who resolved to fly at higher game. Accordingly, Horace Walpole, at that time collecting additional materials for his "Anecdotes of Painting in England," received from C. several pages of antique writings, accompanied by a short note. The pretended MS. gave biographical sketches of celebrated painters who had flourished in England several centuries ago, and of whose existence Walpole had never dreamed. Walpole, put off his guard, answered his unknown correspondent at once; expressed his delight at receiving the MS.; and desired, as a personal favor, that all the other antique writings, poems included, mentioned in the note, should be forwarded. C., highly elated, immediately sent accounts of a great many more painters and poets, and also gave some slight sketch of his personal history. On receipt of this second communication, Walpole suspected a trick. The poems he shewed to Mason and Gray, who at once pronounced them forgeries; he then wrote C., expressing his suspicions as to the genuineness of the MS., and administering at the same time a great deal of excellent advice. C. replied, desiring that the MS. should be returned at once; but by the time the letter reached London, Walpole was about to start for Paris, and it was allowed to remain unanswered. On Walpole's return some six weeks thereafter, a fierce note from C. waited him, the contents of which must have

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brought the blood to his polished and urbane brow; indignant, he bundled up the MS., and returned it without a word of explanation.

From his earliest youth, C. had a ghastly familiarity with the idea of suicide. Among his papers preserved in the British Museum, is a last will and testament, "executed in the presence of Omniscience, the 14th of April 1770," full of the wildest wit and profanity. Another document of similar purport, falling into the hands of his friends, led to his dismissal from from Mr Lambert's office. Released from what he considered the slavery of law, C.'s eyes turned to London, and in that city he arrived, carrying with him all his Rowley MS. and several modern poems, on Tuesday the 24th April 1770, and took up his abode with one Walmsley, a plasterer, in Shoreditch. No sooner had he settled there, than he began to work as with a hundred hands. During the last few months of his life, he poured forth squibs, satiric poems, political essays, burlettas, letters in the style of Junius, and meditated writing a history of England, to appear in parts. For a time, his prospects seemed golden enough. He obtained an introduction to Lord Mayor Beckford; he sent glowing letters home, accompanied by presents to his mother and sisters. Ultimately he left the plasterer's in Shoreditch, and took lodgings in Brooke Street, adjoining Holborn. Unhappily for C., editors of opposition papers were willing enough to insert and praise his articles, but were disinclined or unable to render an equivalent in cash. Possibly they conceived that a patriotism so ardent must be its own reward. The means of life were now fast failing. In desperation, he attempted to procure an appointment of surgeon's mate in a vessel going to Africa, but failed. This was the last drop that made the cup overflow. On Saturday the 25th August, his landlady, alarmed that her lodger did not make his appearance, had the door of his room broken open; saw the floor littered with small pieces of paper, and C. "lying on the bed with his legs hanging over, quite dead." Just at this time, Dr Fry of Oxford, who had seen or heard something of the Rowley poems, was on the eve of starting for Bristol to make inquiry into the matter. Sad enough to think on now: a little promptitude on the one hand, a little patience on the other, and the catastrophe might have been averted.

C. died before he reached his 18th year, and takes his place as the greatest prodigy in literature. Indeed, in our judgment of him, age cannot be taken into account. He never seems to have been young. His intellect was born fully matured. He was equally precocious in other respects. In his letters, he speaks of the relation of the sexes in the tone of a sated *roué*. He never seems to have felt the delicious shame and ingenuousness of youth; over his heart never was outspread "the bloom of young desire and purple light of love." The "Kew Gardens" is written in the style of Churchill, and it possesses all that master's vigor, and every now and then we come on a couplet turned with the felicity of Pope. His genius, however, is in its greatest perfection in the ancient poems. No poet, before or since, has written a tenderer strain than the lament in "Ælla," or conceived a bolder image than the personification of Freedom in the ode to Liberty in his "Tragedy of Godwin." C.'s life has been written by many hands, but the best and most sympathetic sketch of is that given by Professor D. Masson of Edinburgh University in his collected essays.—See the "Poetical Works of Thomas Chatterton," by the Rev. Walter Skeat, M. A. (1875.)

CHAU'CER, Geoffrey, the father of English poetry, was born, most probably, about 1340, though the traditional date is 1328. Recent researches have made it clear that C. was the son of John Chaucer, a London vintner. It has been said that he studied at Cambridge, and afterwards removed to Oxford. While at the University he wrote "The Court of Love," and "The Book of Troilus and Creseide." At one period he seems to have turned his attention to law, and to have become a member of the Inner Temple. About these matters his biographers, knowing little, have conjectured much. The only particular of C.'s youth of which an anxious posterity can be certified is, that he one day thrashed a Franciscan friar in Fleet Street, and was fined two shillings for the exploit on the next. History has preserved this for us, but has forgotten all the rest of his early life, and the chronology of all his poems.

In 1359, C. assures us, on his own authority, that he served under Edward III. in his French campaign, and was therein made prisoner. The date of his return from captivity, and of his subsequent marriage, cannot now be ascertained. He espoused

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Philippa, youngest daughter of Sir Payne Roet, whose estates lay in Hainault. His wife's sister, Katherine, ultimately became the wife of John of Gaunt, Duke of Lancaster; and it may be presumed that the high connection thus established aided, in no inconsiderable degree, the poet's advancement in life. After his marriage, he began to mix in public affairs. He was sent on an embassy to Genoa in 1372, and, on that occasion, has been supposed by some to have had an interview with Petrarch, then residing at Padua, and to have heard from his lips the story of *Griselda*. On his return, he was appointed comptroller of the customs for wools, and in the same year the king granted him a pitcher of wine daily for life. In 1377, C. proceeded to Flanders in the retinue of Sir Thomas Percy, afterwards Earl of Worcester; and for several years thereafter he was employed assiduously in embassies and other business connected with the public service. In 1386, a commission was issued to inquire into alleged abuses in the department of the customs, and C. was dismissed from his comptrollership in the December of that year. On meeting this fact, one cannot help remembering that Edward made the writing out of the accounts in C.'s own hand the condition of his holding office. Had the great poet neglected his duties? It has been conjectured by some, that after his disgrace C. became embarrassed in circumstances, and apparently with reason, for about this time he cancelled both his pensions, and consigned them to one John Scalby, "to whom they were probably sold under pressure of distress," says his latest biographer. In 1387, C. lost his wife. Where he spent his closing years, cannot now be ascertained. Godwin surmises that in his distress he retired to Woodstock, and composed there "The Canterbury tales." It seems, however, to be tolerably certain that during the last years of his life he was resident in London. There he died on the 25th October 1400, aged 74, and was buried in Westminster Abbey, the first of the long line of poets whose ashes make that pile so venerable.

C. was a worthy representative of the splendid 14th century. He was a master of the science, the theology and the literature of his time. He had seen many men and cities, and had formed no inconsiderable unit in imposing ceremonies of state. His poems are numerous, and exhibit every variety of poetical excellence. His earlier performances, such as "The Flower and the Leaf," "The Romaunt of the Rose," are, after the French fashion then prevalent, gorgeous allegories full of queens and kings, bowers, bevies of beautiful ladies, brave knights, and pious nightingales that sing the praises of God. They appeal potently enough to the eye, but they do not in the slightest degree touch the heart, or relate themselves to human concerns. Quite different "The Canterbury Tales," so full of humor, pathos, and shrewd observation. In these Tales, English life, as it then existed, is wonderfully reflected—when the king tilted in tournament, when the knight and the lady rode over the down with falcon on wrist, when pilgrimages bound for the tomb of St. Thomas passed on from village to village, when friars sitting in tavern over wine sang songs that formed a remarkable contrast with the services they so piously and sweetly intoned. All that stirring and gaily apparelled time—so different from our own—is seen in C.'s work as in some magic mirror; and in his case, as in every other, when the superficial tumults and noises that so stun the contemporary ear have faded away, leaving behind that which is elemental and eternal, the poet is found to be the truest historian. Among C.'s other writings may be mentioned, "The Book of the Duchess," "The House of Fame," and "The Legend of Good Women." The genuineness of "The Court of Love" and of "The Flower and the Leaf" is denied by Mr. Furnivall, and by Mr. Skeat in his new edition of C. (4 vols., 1878).

CHAUDES-AIGUES, a town of France, in the department of Cantal, about 12 miles south-south-west of St Flour. It is celebrated on account of its hot mineral springs, which have the property of discharging grease from sheep's wool, and vast numbers of fleeces are sent hither annually to be washed. The waters are also taken for rheumatism and cutaneous diseases. Pop. (1872) 1100.

CHAUDFONTAINE, a village charmingly situated in the valley of the Vesdre, a few miles from Liége, in Belgium, and celebrated for a hot spring which supplies water for hot-baths. There are hotels and lodging-houses for the accommodation of visitors. The place is a favorite resort of the Liégois. There is here a station on the railway from Liége to Aix-la-Chapelle. Pop. (1873) 1893.

CHAUDIÈRE, the name of a river and of a lake of Canada. The river joins the

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St Lawrence from the south, about 7 miles above Quebec, forming the celebrated falls of its own name, about 2¼ miles from its mouth. The lake—merely one of the many expansions of the Ottawa—has on its right the city of that name, the metropolis of the united colony.

CHAUMETTE, Pierre Gaspard, one of the most extravagant characters of the French Revolution, was born, 1763, at Nevers, and made his first public appearance at the Cordeliers Club, where he was introduced by Camille Desmoulins. His "sansculottism" gained for him such popularity, that he was appointed procurator of the community of Paris, in the place of Manuel. C. was very enthusiastic in favor of the "worship of reason." In his zeal, he rejected his own Christian name, Pierre, as having been sullied by saintly associations, and styled himself "Anaxagoras." The institution of the tribunal of the revolution, the decree for a revolutionary army, and the law against suspected aristocrats, were carried into effect by C. along with others. He also proposed that the whole French nation should be made to wear wooden shoes, and to subsist on potatoes; but this was too much even for the chimerical enthusiasm of his compatriots. His antics, however, in connection with the "worship of reason" excited the disgust of Robespierre, who devised measures for bringing the whole company of actors under Hébert to the scaffold. C. was arrested and imprisoned on a charge of having been implicated in a plot against the Convention, and was executed April 13, 1794.

CHAUMONT, a town of France, in the department of Haute-Marne, on an elevation between the rivers Marne and Suize, about 140 miles south-east of Paris. It is generally well built, with clean, spacious streets, and fine promenades round the upper part of the town. There are considerable manufactures, including hosiery, cotton yarn, gloves, &c. On the 1st of March 1814, the allied powers here bound themselves by treaty against Napoleon, in the event of the negotiations at Châtillon ending unsatisfactorily. Pop. (1872) 7984.

CHAUNY, a town of France, in the department of Aisne, about 18 miles west-north-west of Laon. It is built partly on the right bank of, and partly on an island in the river Oise, which is here navigable. It is an old, rather uninteresting place, with manufactures of sacking, hosiery, chemicals, and leather, and an active trade. Pop. (1872) 8883.

CHAUSSES, in the armor of the middle ages, were defence-pieces for the legs. Some were made of padded and quilted cloth, with metal studs; some of chain-mail; some of riveted plates; and some of banded mail. It was not unusual to fasten them by lacing behind the leg.

CHAUVINISME. Chauvin was the name of the principal character in a French comedy, which was played with immense success at the time of the Restoration. He represented a bragging veteran of the empire, who was continually talking of his achievements at Austerlitz and Jena, and his determination to take a brilliant revenge for Waterloo. Since then, a *chauviniste* has come to mean a man who has extravagant and narrow-minded notions of patriotism, and corresponding enmity towards foreign peoples.

CHAUX DE FONDS, a town of Switzerland, in the canton of Neuchâtel, 9 miles north-west of the city of that name. It is situated in a bleak valley, at an elevation of 3070 feet above the sea, and is scattered over a large area, almost every cottage being surrounded by a garden or croft. It is one of the chief seats of the manufacture of clocks and watches in the canton. The mechanics work chiefly at home, each devoting himself to a particular portion of machinery. This industry employs 12,000 hands. Population (1871) 12,930.

CHAY ROOT, Choya, or Sayan (*Oldenlandia umbellata*), a perennial herbaceous plant of the natural order *Cinchonaceæ*, said to be a native both of India and of Mexico. It is cultivated on the coast of Coromandel for the sake of its long, orange colored roots, the bark of which affords a beautiful red dye. The quality of the bark is said to be improved by keeping it for some years. It is the coloring matter obtained from C. R. which is used to paint the red figures on chintz. C. R. is the Indian madder, and in it some tribes in Ceylon formerly paid their tribute.

CHAYENPU'R, a fortified town of Nepaul, in the north of India, about 190

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miles to the east of Khatmandu, the capital of the state, being in lat. 27° 20′ n., and long. 87° 3′ e. It is the chief town of a district which yields rice, wheat, cotton, ghee or butter, timber, spices, sugar, tobacco, and pearls.

CHEA'DLE, a small but neat market-town of England, in the moorland district of the north part of the county of Stafford, 14 miles north-north-east of the town of Stafford, 3 miles from the Froghall station on the Churnet Valley branch of the North Staffordshire Railway, and 4 miles from the Blyth Bridge station on the main line from Derby to Crewe. The town is seated in a pleasant vale, surrounded by hills mostly planted with fir and other trees. The parish church (St. Giles) was a very ancient structure, but was rebuilt in 1887—1888. A magnificent Roman Catholic church, erected at the sole expense of John, Earl of Shrewsbury, was opened in 1846. There are several dissenting chapels, various schools, a mechanics' institute, a large tape manufactory, and also one for silk. There are copper and brass works a short distance from the town, and coal and limestone abound in the vicinity. Pop. (1871) 2929.

CHEATING. In the technical language of the English law, C. means the offence of fraudulently obtaining the property of another by any deceitful or illegal practice short of felony, but in such a way as that the public interest may possibly be affected. In order to constitute C., the fraud must be of such a kind as that it could not be guarded against by common prudence. C., in this sense, is an offence at common law, and indictable, which is not the case with imposition in a private transaction. The law of Scotland has no such distinction. See WEIGHTS AND MEASURES, FALSE PRETENCES, CHARACTER TO SERVANT.

CHECK, a variegated cloth, the pattern of which consists of rectangular spaces like a chess-board (Fr. *échec*, chess), in black and white, or of various colors.

CHE'CKY (Fr. *échiqueté*). In Heraldry, when the field or any charge is composed of small squares of different tinctures, generally metal and color, it is said to be checky.

CHE'DDAR, a village in Somersetshire, on the south side of the Mendip Hills, 2 miles south-east of Axbridge, with a level country to the south. It lies at the entrance of a deep rocky gorge, nearly 1 mile long, overhung by stupendous mural limestone precipices, containing caverns—one being 300 feet long—filled with fantastic stalactites and stalagmites. The celebrated C. cheeses are produced on the rich grass-farms around. The church is supposed to have been built about 1400, and has a sculptured stone pulpit. Population of parish (1871) 2200.

CHEDU'BA, an island off Aracan, in the Bay of Bengal, stretching from lat. 18° 40′ to 18° 56′ n., and from long. 93° 31′ to 93° 50′ e. Its area is about 250 square miles, and its population 9000. Along with the adjacent mainland, it was ceded to the British at the close of the first Burmese war. The soil is fertile, yielding rice, tobacco, sugar, indigo, cotton, hemp, and large quantities of a vegetable oil, equally fitted for burning and for varnishing. The principal mineral is petroleum. The coast presents earthly cones, which emit mud and gas, and about 100 years ago a severe earthquake is believed to have extended the limits of the island.

CHEESE is the common form in which the Caseine (q. v.) of milk is used in a separate state as an article of food. In new milk, the C. is present in a condition soluble in water, and is generally separated therefrom in a coagulated or clotted form, on the addition of a little rennet (q. v.). In the preparation of C., the milk is gently heated to a temperature of 110°—112° F., and placed in a large wooden tub, where the rennet is added, and the operation of *earning* goes on. In about half an hour, the curd is sufficiently formed. The liquid whey being pressed out, the curd is chopped into small pieces of the size of a walnut by a knife, called a curd-cutter, salt is added, and the fragments of curd introduced into a cloth placed in a cheese-vat or chessart, which is a wooden tub of varying size and shape, perforated at the sides and bottom. The whole is then put under a cheese-press (q. v.), and subjected to great pressure, which consolidates the curd or caseine, and at the same time squeezes out the remaining portions of whey. After two or three hours, the half-formed C. is turned and re-turned, each time being subjected to renewed pressure, till in about two days it is sufficiently compacted. It is then removed from the cheese-vat, and placed on a shelf in a dry airy room, where, being repeatedly turned,

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it gradually dries, and gets aged or seasoned sufficiently for market in about six months.

There are many varieties of C., which partly owe their difference to the food of cows, but in greater part to differences in the mode of treating the milk. *Skimmed-milk C.* is prepared from milk from which the cream has been removed, and a rich color is communicated by adding a little Arnotto (q. v.) to the milk before coagulation. *Sweet-milk C.* is procured in a similar manner from the whole milk, and contains much of the butter along with the caseine. *Stilton C.* is made in Leicestershire, by adding the cream of the evening's milk to the new milk of the next morning; and as there is always more trouble in expelling the whey from curd containing butter, there is a difficulty in preparing this variety of C., from its liability to fermentation and bursting. *Cheddar C.* is made in Somersetshire, from the whole milk, and the whey is several times skimmed off, heated, and added to the curd to scald it. *Cheshire* and *Double Gloucester* are made from the whole milk; *Single Gloucester*, from half new milk and half skimmed milk. *Gouda C.* is prepared in Holland from skimmed milk curdled by muriatic acid instead of rennet, and for this reason it is not infested with mites. Holland exports annually about thirty millions of pounds of cheese, the greater portion coming to England. *Suffolk C.* is made from skimmed milk. *Parmesan C.* obtained from Parma in Italy, is also made from skimmed milk, and owes its fine rich flavor to the superior herbage on the banks of the river Po. The cows are kept in the house nearly all the year round, and fed in summer with cut grass. Some of the cheeses are so large as to contain 180 pounds; and the milk of 100 cows is required to produce one of this size. *Swiss C.* is flavored with herbs, and especially that of Gruyère, which is very pleasant to the taste. Gruyère cheeses weigh from forty to sixty pounds each, and are exported in large quantities. *Cream C.* is prepared from cream curd which has been placed in a cloth, and allowed to drain without the assistance of pressure. Bath and York supply C. of this description. In the fabrication of C., minium or red-lead has occasionally been employed as a cheap coloring substance, and cases of poisoning have resulted therefrom. Carrots, saffron, and marigold flowers have also been used for imparting color as well as flavor.

Dunlop C., though nowhere so well made as in the parish in Ayrshire from which it derives its name, is now manufactured in the dairy districts of Scotland generally. The cheeses are made of various sizes—from a quarter to half a hundredweight. Sometimes the entire milk is used, but generally the cream is removed from the evening's milking. Of late years, great improvement has taken place in the manufacture of cheese in the Scottish dairy districts, Ayrshire, Lanarkshire, Wigton, and Kirkcudbright. Much of what is sold as Cheddar (q. v.) cheese is really made in Scotland. The annual Kilmarnock "Cheese Show" is one of the largest in the world, the value of the cheese exhibited being often more than £20,000.

When sufficiently dry for use, C. still retains from 35 to 44 per cent. water, and besides the caseine contains a greater or less proportion of oil or fat and saline matter—the latter mainly consisting of common salt, originally present in the milk, and added during the manufacture of the cheese. As an article of diet, C. is highly nutritious; but from its costive properties, it is mainly used as a condiment in small quantity after an ordinary meal, and is then serviceable in giving an impetus to the process of digestion. To serve the purpose of a digester, C. must be old and and partially decayed, or mouldy. It then acts as leaven, and causes chemical changes gradually to commence among the particles of the food which has previously been eaten, and thus facilitates the dissolution which necessarily precedes digestion.

Cheese Press.—The old method of compressing curd and expelling the whey from it is still employed in many places, the mere piling of weights on the cheese-vat. Sometimes the action of a screw is employed. Among improved dairy implements are now reckoned, however, many ingenious and elegant forms of cheese press, generally depending on the action of a lever. They are much more convenient than the clumsy contrivance they have superseded. Factories for the manufacture of cheese have been established in the United States and Canada, by which cheese is produced in immense quantities, and a factory on a similar principle has been lately established in Derbyshire. The cheese made in the United States and

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Canada is now imported into Great Britain in immense quantities, and is steadily increasing in favor.

CHEESE-HOPPER, the larva of *Piophila casei* or *Tyrophaga casei*, a small *dipterous* (two-winged) fly, of the large family *Muscides*, the same to which the house-fly, blow-fly, &c., belong. The perfect insect is about a line and a half in length, mostly of a shining black color; antennæ, forehead, and some parts of the legs rufous. It is a pest of dairies and store-closets, laying its eggs in cracks or crevices of cheese, the destined food of its larvæ. To preserve cheese from this pest, it is of advantage to brush or rub them frequently, and to remove all cracked or injured cheeses from large stores, besides keeping them dry and in a well-aired place. The same rules are applicable to their preservation from the other insect larvæ by which they are sometimes infested, of which the most notable are those of the Bacon Beetle (see DERMESTES), and of another species of dipterous fly, *Musca corvina*.

CHEE'TAH, Chi'ttah, or Hunting Leopard (*Felis jubata* or *Cynailurus jubatus*), an animal of the feline family, but differing from all the rest of that family in its longer and narrower feet and less retractile claws, which are also more blunt and less curved. With these peculiarities are associated a greater length of limbs than is usual in feline animals, adapting it to take its prey by running rather than by leaping, and an intelligent and tractable disposition, constituting an additional point of resemblance to dogs: with which, however, the form of the head and the internal anatomy have nothing in common, but are entirely feline. The C. is in size about equal to a leopard, but the body and limbs are longer. It is very widely distributed, being found in Senegal, South Africa, Persia, India, Sumatra, etc. Its geographic range extends as far north as the Caspian Sea, and the steppes of the Kirghiz Tartars. The Asiatic species described as *Felis venatica* appears to have been fully identified with *F. jubata;* and differences in the quantity of mane, and other unimportant particulars, may probably sometimes have resulted from domestication; for this animal has been long domesticated and employed in the chase, both in Persia, where it is called *Youze*, and in India. Deer and antelopes are the game principally hunted with the C., and packs are kept by Indian princes. The head of the C. is kept covered with a leather-hood till the game is discovered, when the hunting party, advancing cautiously to within 200 yards of it, the hood is taken off, and the C. stealthily creeps towards the herd, taking advantage of every bush and inequality for concealment, till, on their shewing alarm, he is amongst them at a few bounds, and striking down his victim with a blow of his paw, instantly tears open its throat, and begins to suck the blood. It is then somewhat difficult to withdraw him from his prey, which is generally done by offering him meat. If unsuccessful, the C. does not attempt to follow the herd by running—nor does this animal seem to possess the power of maintaining speed through a lengthened chase—but slowly, and as if ashamed, creeps back to the hunters. The C. is not unfrequently to be seen in menageries in Britain. In a domesticated state, it is extremely fond of attention, and seems to repay kindness with affection. The skin is frequently imported from Africa.

CHEIRA'NTHUS. See WALLFLOWER.

CHEIRO'LEPIS, a genus of fossil ganoid fish, peculiar to the Devonian measures, in which eight species have been found. They had large heads, the spine continued in a rudimentary condition, and the body was completely covered with small lozenge-shaped ganoid scales. The first ray of each fin was converted into a strong spine, whose base was loosely imbedded in the flesh. The pectorals and ventrals were largely developed, while the dorsal was small, and situated behind the anal fin. The generic name, meaning "scaly-hand," was given in allusion to the large scaly pectorals.

CHEI'ROMANCY (Gr. *cheir*, the hand; *manteia*, prophecy), or Palmistry, a form of divination that professes to read the destiny of an individual by the lineaments of the hand. In the middle ages, C. occupied the attention of Cardan, Paracelsus, and other eminent men who elaborated it into a system. It is now, however, the exclusive property of the gipsies, who still find among maid-servants sufficient credulity to make its practice profitable.

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CHEI'ROMYS. See AYE-AYE.

CHEIRONE'CTES, a genus of marsupial quadrupeds, differing from the opossums chiefly in having webbed-feet and aquatic habits. *C. palmatus* or *C. Yapock*, sometimes called the Yapock Opossum, or simply the Yapock, from the South American river of that name, is common in many rivers of Brazil and Guiana. It has a soft woolly fur, the color of the upper parts of the body is gray, with large transverse patches of black, connected with a dorsal black line, the breast and belly white; the tail is long, very thick at the base, tapering to the tip and except at the base covered with scales. The cheek-pouches are very large. Crustaceans are said to form the chief food of this animal, which is interesting as a sort of marsupial representative of the otter.

CHEIRO'PTERA. See BAT.

CHEIROTHE'RIUM, the name given by Dr Kaup to the animal which produced the peculiar hand-like impressions (hence the name, "hand-beast") on the Triassic rocks of this country and Germany. The remains of the animal having been found, and its structure made out, this name has given place to the more characteristic one of *Labyrinthodon* (q.v.).

CHEKE, Sir John, who deserves to be remembered as one of the revivers of classical literature in England during the 16th c., was born at Cambridge, June 16th 1514. Entering the university of Cambridge, he devoted himself assiduously to the study of Latin and Greek, particularly the latter language, then much neglected in England. He labored earnestly to advance the study of the Greek language and literature; and when the first professorship of Greek was founded in Cambridge by King Henry VIII., about 1540, C. was appointed professor. A new mode of pronouncing Greek which he introduced was assailed by Bishop Gardiner, the chancellor of the university; but notwithstanding, C.'s system prevailed. C. was for a time preceptor of the Prince, afterwards Edward VI., whose elevation to the throne secured him rank, wealth, and honor. But being a Protestant, he was stripped of everything when Mary came to the throne, although other lands were given to him on his returning to the Roman Catholic Church, which he did to escape burning, the only alternative offered him by Cardinal Pole. His recantation preyed on his mind so much, that he died in the course of the following year, September 1557. He left several works in Latin, and a pamphlet in English; and among his MSS. was a translation of the Gospel by Matthew, exemplifying a plan for reforming the English language by eradicating all words save those derived from Saxon roots.

CHELM, or Cholm, a town of Russian Poland, in the government of the same name, 126 miles south-east of Warsaw. It is the seat of a United Greek bishop, and has a theological seminary. The Poles were defeated here by the Russians, June 4, 1794. Pop. (1867) 4483.

CHE-KEANG, one of the eastern and maritime provinces of China, the smallest of the eighteen. Situated in the southern portion of the great plain, it is possessed of great fertility, and produces silk, tea and rice in abundance. Its capital, Hang-chow (q. v.), an important and populous city, is the metropolis of the silk districts. "Above is Paradise," say the Chinese; "below are Soo-chow and Hang-chow." Both the places were taken by the Taeping rebels in 1860. Ning-po (q. v.) is the principal port of the province. Pop., according to the Chinese census of 1812, 26,256,784. Area, 39,150 sq. m.

CHELI'CERÆ, or antennal claws, modified antennæ, which in some of the Crustaceans, and in most of the Arachnida, serve a purpose corresponding with that of the mandibles of insects in the cutting, tearing, or bruising of food. They move, however, up and down, in a direction contrary to that of the mandibles of insects.

CHE'LIFER, a genus of *Arachnida* (q. v.) of the order *Trachearia*, and of the family to which, from their resemblance to scorpions without tails, the name *Pseudoscorpions*, or False Scorpions, has been given, the true scorpions belonging to the order *Pulmonaria*. The genus C. consists of minute species in which this resemblance is very strong. The palpi are elongated and armed with pincers. The species live under the loose bark of trees, in chinks of old furniture, &c. One species, *C. can-*

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croides, about a line and a half in length, is frequently to be seen in old books, herbaria, &c., and is called the *Book Scorpion*; it is said to be useful as feeding on the insects which are most destructive to books and collections in natural history.

CHE'LMSFORD, the county town of Essex, near the centre of the county, at the confluence of the Chelmer and the Cann, 29 miles north-east of London. The industry of C. is chiefly agricultural. The town is the seat of assizes and local courts, and has a grammar-school founded by Edward VI. Pop. (1871) 9318. On a small island called Mesopotamia, in the Chelmer, there has long been a ludicrous mock-election of a member of parliament during the county elections.

CHELO'NIA (Gr. *chelōne*, a tortoise), an order of Reptiles, corresponding in extent with the genus *Testudo* of Linnæus, and of which the most obvious distinguishing character is the enclosure of the whole body in a protective covering connected with the skeleton, so that only the head, the tail, and the limbs are protruded; the limbs, four in number, and all formed on the same plan, are used by some as feet for walking on dry ground, by others as paddles for swimming. The bony covering consists of two principal parts, called the *carapace* and the *plastron*; the carapace serving as a buckler for the upper parts, and the plastron for the under parts of the body. The carapace is formed from the ribs, of which there are eight pair, and from the annular parts of the dorsal vertebræ, expanded into plates, which are joined to each other by dentelated sutures, so that the whole acquires great firmness, and the dorsal vertebræ are rendered immovable. The plastron is formed of pieces which represent the sternum or breast bone, and which are ordinarily nine in number. So compact and strong is the case of some of the tortoises, that it will bear immense pressure without injury, the arched form of the carapace adding to its strength; whilst the creature, destitute of other means of defence and incapable of flight, finds safety, at least in its mature state, from all enemies but man, by drawing its head, tail, and limbs, within the protecting case, which in some, called Box-tortoises, has certain plates movable, so as more completely to enclose them. The turtles and other aquatic chelonians cannot thus withdraw their head, tail, and limbs from danger, but the greater activity of their movements compensates for this.

The firmly fixed ribs not admitting of the movements by which respiration ordinarily takes place in other vertebrate animals, the C. gulp down air, which they inhale entirely through the nostrils; first filling the cavity of the mouth by elevating the hyoid bone, and then, by depressing it, forcing the air into the lungs, whilst the inner aperture of the nostrils is closed by the tongue. In other respects, as to aëration and circulation of blood, they resemble other reptiles.

The jaws are not furnished with teeth, but act in a manner more resembling that of the mandibles of birds, being like them hard, sharp, and horny. The food of the C. is various. Some of them, among which are all the land-tortoises, subsist exclusively on vegetable food; some of the aquatic C. pursue and eat other aquatic animals.

All the C. are strictly oviparous. Their eggs are hatched by the heat of the sun alone; they lay a great numbers at a time, which are covered with a calcareous shell, like those of birds. The eggs of the fresh-water tortoises are in some places a lucrative article of commerce, from the quantity of oil which is obtained from them.

The C. are found only in the warmer parts of the world, but their numbers in some places are astonishingly great. None of them can properly be reckoned British, although stray turtles have, in a few instances, been found on the British shores. A few species occur in the southern parts of Europe, and some are found in the temperate parts of North America.

All the species are extremely tenacious of life; they are capable of extraordinary abstinence, and of living long after having sustained injuries which would have been immediately destructive to almost any other animal. They are also remarkable for their longevity.

The flesh of some kinds of turtle is well known as an excellent article of food. The eggs of some are equally an esteemed delicacy. Tortoise-shell (q. v.), and the oil already mentioned, are the only other valuable products of the order.

Further information concerning the C. will be found in particular articles devoted to some of the different genera and species. See also REPTILES.

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Fossil Chelonia.—Foot-tracks on the Triassic sandstone of Dumfriesshire were referred by their discoverer, Dr. Duncan, to tortoises. Similar tracks have been noticed in Devonian and Oolite strata. Their vagueness, however, does not indicate with any certainty the animals which produced them. The first indisputable evidence of chelonian life occurs in the Upper Oolite, where the remains of several pond-tortoises and two or three turtles have been observed. In the newer deposits, they increase in number, so that between 70 and 80 species have been described from the Tertiary strata. In the Eocene deposits of the London Clay, at the mouth of the Thames, there occur the remains of more species of true turtles than are now known to exist in the whole world. Some of these fossil C. were of a size proportioned to their colossal companions; as, for instance, the gigantic Land Tortoise (*Colossochelys*) of the Sewalik Hills, whose carapace was as much as 20 feet in length.

CHE'LSEA, a suburb of London, in Middlesex, on the left bank of the Thames, 4½ west-south-west of St Paul's. The river is here crossed by a fine iron bridge. Pop. (1871) 238,050. Many of the nobility and gentry formerly resided at C., and some of its coffee-houses were much resorted to by pleasure-parties in the 17th and 18th centuries. C. has water-works to supply London, a chain-pier, and floor-cloth factories, besides a training-college for male, and another for female teachers, and the Cremorne House Gardens, now a place of public amusement.

CHELSEA HOSPITAL is an asylum for disabled or superannuated soldiers. The building was commenced in 1609, as a Protestant theological seminary, by Dr Matthew Sutcliffe, Dean of Exeter; and James I. gave it a charter in 1610, as *King James's College*. When Sutcliffe died, in 1629, the building was less than half finished, and the students were only 15 in number. Shortly after this, the scheme was abandoned, and the building used for various purposes. It was then rebuilt, and made into an hospital for disabled soldiers by Charles II. By a warrant issued in 1684, one day's pay per year, and two in leap-years, was deducted from soldiers' pay for supporting Chelsea Hospital. This deduction has long ceased: the hospital being maintained by parliamentary grant. The hospital has accommodation for about 600 persons besides officers. Attached to it are about 40 acres of land, used as public gardens and exercise ground. It is governed by a Board of Commissioners, comprising *ex officio* the Lord President of the Council, the First Lord of the Treasury, and the Secretaries of State; but the more immediate management is in the hands of about 120 persons, of whom 20 are military officers, 20 civil officers, and the rest subordinates.

The establishment is maintained for the *in-pensioners* of the British army, who, in the army Estimates for 1876—1877, are set down at 588. These in-pensioners, besides board, lodging, clothing, washing, medical aid, &c., receive a small sum in money, varying from 5*s.* 3*d.* per week for a color-sergeant, down to 7*d.* per week for a private soldier. They are all dressed in uniform—red, with blue facings—and are treated as a garrison, in respect to guards, sentinels, &c. There is a certain degree of choice open to the men, as to whether they will be *in* or *out* pensioners. The out-pensioners, who are more than a hundredfold as numerous as the others, receive sums of money varying from 1½*d.* to 3*s.* 10*d.* per day for life, as a reward for past services. Vacancies in the hospital are filled up once a quarter; and every person admitted must give up his out-pension before he can become an in-pensioner. The cost of the hospital for 1876—1877 was estimated at £28,916. This is exclusive of *out*-pension charges. Doubts have frequently been expressed as to the usefulness of this expenditure; it is exceptional in its character, and the arrangement to which it refers is not in much favor among the soldiery.

CHE'LTENHAM, a town, parliamentary borough, and fashionable watering-place, in the county of Gloucester, eight miles north-east of Gloucester. It lies in a picturesque and healthy valley on the Chelt, a small stream which rises in the adjacent hills, and flows into the Severn. It is sheltered on the east and south-east by a semi-circle of the Cotswolds. It owes its celebrity and rapid increase to its mineral springs, of which there are several varieties. The chief street is upwards of a mile long, right and left of which are spacious and elegant squares and crescents, and innumerable villas lately erected for the accommodation of the numerous visitors. Attached to the spas are handsome pump-rooms—with tasteful grounds, avenues, saloons—lodging-houses, and public promenades among the finest in England, be-

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sides many fine mansions in and around the town. It has 10 churches and a number of dissenting chapels. Of late years, C. has become famous for its public schools, the oldest of which is its endowed grammar-school, capable of educating 300 scholars; but the largest, and now the most celebrated, is its Proprietary College, for the sons of gentlemen, a noble institution, educating, upon an average, 600 pupils. There are also a Ladies' College, a Junior Proprietary School, and a number of private scholastic establishments. There are public assembly-rooms in the town; which is also much resorted to in winter for its hunting. It has two clubs, and five or six weekly newspapers. Pop. (1871) 44,519. C. returns one member to parliament. Its affairs are managed by a board of elected commissioners. It has no manufactures of any importance. C. was only a village in 1716, when the first spring was discovered. It gradually increased till 1788, when the benefit received by George III. from its waters suddenly made it a resort of fashion.

CHE'MIC is the name given to BLEACHING POWDER by those engaged in chemical works.

CHEMICAL Nomencla'ture and Nota'tion. (During the progress of the "Encyclopædia," the nomenclature and notation of chemistry were greatly changed. What follows here is allowed to stand, as the old names and notation are still found in books in use, and are often used concurrently with the new.) In early times, chemical substances were named according to the fanciful theories of Alchemy (q. v.). Thus the name *flowers of sulphur* was applied to the sublimed sulphur, which grew or sprang like a flower from sulphur when heated; *spirit of salt*, to hydrochloric acid, the corrosive acid or spirit obtained from common salt; and a multitude of other names had a like fanciful origin. In 1787, Lavoisier founded the system of nomenclature which is followed still by chemists. At first, it was intended that the names of simple as well as compound substances should be regulated by system. Hence such terms as oxygen (from *oxus*, acid, and *gennao*), *the acid-producer*, given from the notion then held that no acid was without oxygen; and hydrogen (from *hydor*, water, and *gennao*), *the water-producer*, from the supposition that hydrogen had more to do with the formation of water than any other element. The advance of chemistry, however, has so completely changed the opinion of chemists regarding the simpler bodies, that such names are now found to mislead; and thereafter, though such as had been given on this system were retained, their meaning has been discarded, and the systematised nomenclature restricted to compound substances. A remnant of the system, however, still subsists at the present time, in making the scientific names of all the metals end in *um*. In the non-metallic elements, a close analogy exists between chlorine, bromine, iodine, and fluorine; and to indicate this, the common termination *ine* has been given; and for a similar reason, carbon, silicon, and boron, end in *on*. As a general rule, however, the chemical name of an elementary substance does not convey any scientific meaning, and must be regarded as a simple mark or designation, analogous to the names of persons, which give no notion regarding their moral character or physical development. The ancient and more common metals retain their popular title, such as gold, silver, and copper; but the more recently discovered metals have names given which end in *um*. The symbol of an element is obtained from the first letter of its Latin name, as O for Oxygen; Pl for lead (Lat. *plumbum*). When the names of two or more elements commence with the same letter, a smaller letter or satellite is attached to one or more of these; such as S for sulphur, Se for selenium, and Si for silicon. For a complete table of the symbols of the elementary substances, see ATOMIC WEIGHTS.

The name of a compound substance generally indicates the elements of which it is composed. Thus the name oxide of iron indicates that the red powder (rust) is made up of oxygen and iron; the sulphuret of lead (galena), that it is composed of sulphur and lead. In all similar combinations—

Oxygen	forms	Oxides.
Chlorine	"	Chlorides.
Bromine	"	Bromides.
Iodine	"	Iodides.
Fluorine	"	Fluorides.
Nitrogen	"	Nitrides.

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Carbon	forms	Carbides or Carburets.
Sulphur	"	Sulphides or Sulphurets.
Selenium	"	Selenides or Seleniurets.
Phosphorus	"	Phosphides or Phosphurets.

When two elements combine with each other in more than one proportion or equivalent (see ATOMIC THEORY and ATOMIC WEIGHTS) the names of the compound bodies are contrived so as to express this. The term *proto*xide is applied to a compound of one equivalent of another element; *deuto*xide to a compound containing a larger proportion of oxygen than the protoxide; and *trito*xide when the oxygen is still further increased. The term *bino*xide is used when oxygen is present in the proportion of two equivalents to one equivalent of the other element; and *tero*xide when the proportion is as three to one. A *sub*oxide contains less than one equivalent of oxygen; and a *per*oxide is the highest oxide not possessing acid properties. The same prefixes are applied to the compounds of Chlorine, sulphur, &c.

When one element combines with another to produce several compounds possessing acid properties, various terminations are employed to distinguish the compounds. Thus, oxygen combines with a number of the elements to produce with each a series of acid compounds, the more *highly* oxidised of which receive the termination *ic*, whilst those containing *less* oxygen end in *ous*. Thus, sulphur*ic* acid contains three equivalents of oxygen to one equivalent of sulphur; and sulphur*ous* acid, two equivalents of oxygen with one equivalent of sulphur. These terminations are qualified by the use of the prefixes *hypo* (under) and *hyper* (over). Thus *hypo*sulphur*ic* acid is applied to a compound containing less oxygen than the sulphur*ic* acid, and *hypo*sulphur*ous* to one with less oxygen than sulphur*ous* acid.

When acids combine with bases or metallic oxides to form salts, they produce compounds, the names of which are influenced by the terminations of the acids. Thus, sulphur*ic* acid and soda form the sulph*ate* of soda; sulphur*ous* acid and soda, the sulph*ite* of soda; and *hypo*sulphur*ous* acid and soda, the *hypo*sulph*ite* of soda. In the same manner, nitr*ic* acid with potash forms the nitr*ate* of potash, whilst nitr*ous* acid and potash produce the nitr*ite* of potash.

If a symbol be employed alone, it represents one equivalent of the element. Thus, O signifies one equivalent, or eight parts by weight, of oxygen; C., one equivalent, or six parts by weight, of carbon; H, one equivalent, or one part by weight, of hydrogen. The combination of two elements is represented by placing the symbols for those elements side by side; thus, HO signifies one equivalent of hydrogen and one equivalent of oxygen in a state of chemical combination (viz., water); and NaCl is one equivalent of sodium (Lat. *natron*) united with one equivalent of chlorine (viz., common salt).

When two or more equivalents of one element unite with one or more equivalents of another element, the number of such equivalents is signified by a small figure being placed immediately after the symbol of the element so multiplied. Thus, HO_2 represents one equivalent of hydrogen in combination with two equivalents of oxygen (peroxide of hydrogen); MnO_2 is one equivalent of manganese with two of oxygen (black oxide of manganese); Fe_2O_3 is two equivalents of iron with three equivalents of oxygen (rust); and Pb_3O_4 is three equivalents of lead with four equivalents of oxygen (red lead).

In expressing the formula of a compound substance, the symbol of the metal or its analogue is placed first in order, and is succeeded by the oxygen, chlorine, or similar element. Thus, the symbol for chloride of mercury is always written HgCl, never ClHg. The same order is carried out in the construction of the formula of more complex substances; the metallic half is placed first. Thus, sulphate of iron —containing sulphuric acid and the oxide of iron—is always expressed as FeO,SO_3, never SO_3FeO. In other words, the symbols are written in the order in which the substances would be named in Latin.

In the construction of the formulas of complex substances, the comma (,) and *plus* sign (+) are often introduced; the former to separate the symbols of substances which are closely united together, and the latter to form a line of demarcation where the components are less intimately combined. Thus, FeO,SO_3+KO,SO_3, represents the compound of the sulphate of iron with the sulphate of potash; $KCl+PtCl_2$ is the double chloride of potassium and platinum.

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Large figures placed at the left hand of a formula multiply all the symbols till a comma or plus sign appears. Thus, $3SO_3$ represents three equivalents of sulphuric acid; $3PbO,\overline{A}$ is three equivalents of oxide of lead, and one equivalent of acetic acid; and $KO,SO_3+Al_2O_3,3SO_3+24HO$ (alum) is one equivalent of the sulphate of potash, with one equivalent of the sulphate of alumina, and 24 equivalents of water. When a compound substance requires to be multiplied, it is enclosed within parentheses, and a large figure placed immediately before it; thus, $3(KO,C_2O_3)+Fe_2O_3,3C_2O_3+6HO$ represents three equivalents of oxalate of potash, one equivalent of oxalate of iron, and six equivalents of water.

In expressing the formulas of organic compounds, the symbols are written in the following order: CHNO. Thus, turpentine is C_5H_4, alcohol is $C_4H_6O_2$, and morphia is $C_{34}H_{19}NO_6$.

Arbitrary symbols are occasionally used to represent important complex substances. Cyanogen is known as Cy; the organic acids are recognized by their initial letter with the sign (—) drawn above, as $\overline{T}$ for tartaric acid, $C_8H_4O_{10}$; $\overline{A}$ for acetic acid, $C_4H_3O_3$; and $\overline{O}$ for oxalic acid, C_2O_3; while the alkaloids are represented by their initial letter or letters with the sign (+) above; thus, $\overset{+}{S}r$ for strychnine, $C_{42}H_{22}N_2O_4$; $\overset{+}{M}o$ for morphia, $C_{34}H_{19}NO_6$; and $\overset{+}{Q}$ for quinine, $C_{40}H_{24}N_2O_2$.

Occasionally, in treatises on mineralogical chemistry, arbitrary modes of expressing the composition of minerals are resorted to, which it is not necessary here to explain. See CHEMISTRY.

CHEMICAL TOYS, which in the course of recent years have been brought prominently before the public, deserve a brief notice. "Pharaoh's Serpents," already described in the article SULPHOCYANOGEN, are highly poisonous, and during combustion evolve dangerous vapors. *Larmes du Diable*, or "Crocodiles' Tears," are formed of metallic sodium, burn with extreme violence if thrown into water, or even if moistened with water or heated, and scatter particles of caustic alkali, which may inflict serious burns. "Sunshine in Winter Evenings," "Fiery Swords," &c. are formed of magnesium, and, like the preceding, may cause serious burns. "Sensation Cigarettes" are charged with gun-cotton, and project, when fired, noxious vapors into the mouth; while pyroxylin, which is bibulous paper rendered highly explosive by the action of strong nitric and sulphuric acid, and which is identical with gun-cotton, is the active agent in the various toys known as "Will-o'-the-wisp Paper," "Parlor Lightning," "Fireflies," "Aërial Glow-worms," "Chinese Fire-paper," &c.

The use of these toys in teaching rudimentary chemistry to children and young persons is quite incommensurate with their danger.

CHEMISTRY is that branch of natural science which takes cognizance of the changes that bodies undergo when they are influenced by affinity (q. v.). Changes that do not alter the nature and properties of substances—such as the falling of a body by gravity, or its expansion by heat—belong to Physics or Natural Philosophy. In chemical changes, again, the properties of the substances are permanently altered. Thus, when a piece of iron is left exposed to damp air, it is after a while converted into a reddish brittle substance (rust), owing to the union with it of the oxygen of the air. Chemistry, then, may be most simply defined as that branch of natural science which considers (1.) The combination of two or more substances to form a third body, with properties unlike either of its components; and (2) The separation from a compound substance of the more simple bodies present in it: and considering that the steps of the combination and decomposition of substances can never be correctly understood without an intimate knowledge of the properties of substances, it follows that the science of C. must likewise take into notice the description of all the simplest as well as the most complex bodies.

When the science of C. is considered as a whole, including the properties of all the elements or substances, and the combinations and changes which they can under all circumstances undergo, it is distinguished by the title of *Pure, Theoretical*, or *Philosophical C.* Particular departments of C., where the science is confined to the examination of special objects, receive distinctive names; as *Physical C.*, or

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Chemical Physics, which considers phenomena bordering on natural philosophy and C.; *Mineralogical C.*, which takes cognizance of the composition of minerals; *Physiological C.*, which includes the changes which food undergoes in its transit through the animal economy, and the transformations that take place in organic substances generally; *Medical C.*, which considers the composition and compounding of medicines; *Agricultural C.*, which relates to the composition of soils and manures, the ingredients in plants, and the best modes of supplying the food they require, &c. *Inorganic C.* takes cognizance of dead matter, and the changes it undergoes, whilst *Organic C.* considers the substances obtained from plants and animals.

C. ranks as one of the arts as well as one of the sciences, and the division of *Practical C.* comprehends the rules and processes which must be followed, and the mechanical means which must be resorted to, for the successful prosecution of the art. Practical C. is subdivided into *Analytical C.* (q. v.), which is occupied with the separation of simple substances from more complex—as chlorine (Cl) and sodium (Na) from the chloride of sodium or common salt (NaCl)—and to the estimation of the quantities of the several ingredients; and *Synthetical C.*, which has for its object the union of simpler bodies to form more complex—as hydrogen (H) and oxygen (O) to form water (HO). The art of *Assaying* (q. v.) is a department of analytical chemistry. *Applied C.* includes the art of manufacturing the various substances employed in commerce and in domestic life, so far as chemical processes and applications are required. It is subdivided into *Technical C.*, which relates to everything connected with the arts and manufactures; and *Pharmaceutical C.*, which takes cognizance of the substances used in medicine.

History.—The Egyptians appear to have possessed the greatest amount of chemical knowledge of all the nations of antiquity. They preserved dead bodies from decay (see MUMMY), fixed colors in silk by means of mordants, prepared many medicines and pigments, as also soap, beer, vinegar, metals and metallic alloys, common salt, vitriol, soda, sal-ammoniac, glass, enamel, tiles, and painted earthenware. The Chinese were very early acquainted with the processes for dyeing, and the preparation of metallic alloys, the fabrication of nitre, sulphur, gunpowder, borax, alum, porcelain, verdigris, paper, &c. From the Egyptians, the Greeks and Romans derived what chemical knowledge they possessed; but they added little or nothing; and when the migration of the northern tribes, and overthrow of the Roman empire, took place, a stop was put for a time to the advancement of all science in Europe. The prosecution of chemical knowledge was taken up by the Arabs before the 8th c., and was carried on by them and by their European scholars the alchemists with the results described under ALCHEMY. The first germs of a real science of C. seem to appear about the end of the 17th and beginning of the 18th c., in the speculations of Becher (q. v.) and the Phlogistic theory of Stahl (q. v.). After this, C. rapidly advanced. In 1718, Geoffrey brought out the first table of *Affinities*; in 1732, Boerhaave published many original experiments on the chemical relations of heat and light; in 1724 Hales, and in 1756 Black, published researches on the air and aëriform bodies, showing that the carbonic acid evolved during fermentation, respiration, and by the action of acids on chalk, was different from atmospheric air. In 1754—1759, Margraff added to the then known earths—lime and silica—two others, alumina and magnesia; he also extracted sugar from plants. In 1770, Priestley began to announce his discoveries of oxygen, ammoniacal, hydrochloric, and sulphurous acid gases, &c. In 1773—1786, Scheele contributed chlorine, hydrofluoric, prussic, tartaric, and gallic acids; also baryta, phosphoric acid from bones, &c., and gave the first hints regarding a new doctrine of combustion. About the same time Bergman and Cavendish enlarged our knowledge of the gases. Lavoisier, between 1770 and 1794, reorganised much of the then known C., and founded a system of C. which still remains as the skeleton of the science. Berthollet, in 1787, contributed much to the doctrine of affinity, and made researches in chlorine, &c. Fourcroy and Vauquelin advanced organic C.; Klaproth gave many contributions to mineral C. Richter devoted himself to the doctrine of combining proportion, which was afterwards perfected by Dalton, as noticed under ATOMIC THEORY (q. v.). The discovery of galvanic electricity by Galvani, and its advancement by Volta, led Sir Humphry Davy, and others, to important researches in the metals and gases. Gay Lussac and The-

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nard advanced our knowledge regarding organic substances and the chemical relations of heat. Berzelius made laborious researches in mineral C., and gave an exactness to this department which is matter of astonishment to the chemists of the present day. He was also the author of the electro-chemical theory, which has been almost perfected by the labors of Faraday, De la Rive, Becquerel, &c. Organic C. has latterly advanced most rapidly under the researches of Liebig, Wohler, Mitscherlich, Mulder, Laurent, and others. See ATOM, ATOMIC THEORY, ATOMIC VOLUME, ATOMIC WEIGHTS, AFFINITY.

It is impossible in this additional article to do more than briefly describe some of the most important of the numerous changes which have been introduced into the science of chemistry within the last few years.

1. The system of measuring temperatures, lengths, weights, and volumes has been altered. The Centigrade has completely superseded the Fahrenheit thermometric scale in all recent chemical works, and the French metric (which is a decimal) system has been adopted for all measurements and weights, inches and their fractions being replaced by 10ths or 100ths of a mètre, and grains by grammes. It has this advantage over all other systems, of possessing one fundamental linear unit, from which all the ramifications of linear, superficial, or solid dimensions, and of weight are derived. See METRE, LITRE, GRAMME, FRANC. This unit is the 10-millionth part of a quadrant of the meridian, or of the distance from the pole to the equator. It is only to measures of weight and capacity or volume that we need here refer. "*Multiply*," says Dr. Hofmann in his energetic appeal in favor of the metric system, "the cubic mètre by one million, and you have a fit measure in terms of which to express the *capacity* of the Atlantic, or its *cubical contents* of brine; *divide* the cubic mètre by one million, and you arrive at the petty volume of the gambler's ordinary die."—"Modern Chemistry," p. 124. This last-named volume, the millionth of a cubic mètre, taken as so much distilled water at a temperature of 4° C. (its point of greatest density), furnishes the metrical *unit of weight* called the *gramme*, which thus forms a link connecting weight with measure. Again, dividing the edge of a *mètre cube*, which is a linear metre, into 10 parts, called *decimètres*, and cubing one of these parts, we obtain a unit of volume or capacity to which the term *litre* is applied. The various weights in use are all multiples or divisions by tens. Thus, 10 mètres form a decamètre, 100 a hectomètre, and 1000 a kilomètre; while $\frac{1}{10}$th of a mètre is called a decimètre, $\frac{1}{100}$th a centimètre, and $\frac{1}{1000}$th a millimètre, the Greek prefixes in all cases denoting multiplication, and the Latin division. The reader will do well to recollect the following rough comparisons between the chief French and English measures chiefly used in chemistry, as otherwise he can form no conception of the length, size, or weight of the substances treated of: A mètre = nearly 1·1 linear yard = 39·37 inches; a millimètre = 0·039, or nearly $\frac{1}{25}$th of an inch; a centimètre = 0·39, or nearly $\frac{4}{10}$ths of an inch; and a decimètre = 3.94, or nearly 4 inches; a gramme = 15·43 grains; and a litre = rather more than 61 cubic inches, or a pint and three-quarters. A cubic decimètre is employed as a unit for measures both of weight and of volume, for in the former capacity it contains, at 4° C., 1 kilogramme, or 1000 grammes of distilled water, and in the latter it loses its name of kilogramme and receives the appellation of *litre*, which corresponds to 1000 cubic centimètres, or $\frac{1}{1000}$th of a cubic mètre. Chemists have long felt the want of an appropriate *volume*, with its corresponding weight, to serve as standard units of measurement, and Professor Hofmann has selected 1 cubic decimetre = 1 litre, as the most appropriate unit of volume, and the weight of this measure of pure hydrogen as the unit of weight, hydrogen being taken at 0° C. temperature, and 0m·76* pressure. To this standard *weight-unit*, which = 0·0696 of a gramme, he assigns the name of *crith*, from the Greek *krithé*, a barley-corn, signifying figuratively a small weight; and the weight is now in universal acceptation amongst modern British chemists. There is probably no figure in chemical science

* It is almost unnecessary to notice that 0m·76 signifies 0·76 of a mètre, or nearly 30 inches—the ordinary atmospheric pressure at the level of the sea, and at lat 51½°.

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more important than this one (0·0896 of a gramme) to be remembered and kept ready for calculation; for it is the standard multiple or co-efficient by means of which the weight of 1 litre of any other gas, simple or compound, is computed. "For example, the relative volume-weight of chlorine being 35·5, that of oxygen 16, and that of nitrogen 14, the actual weights of 1 litre of each of these elementary gases at 0° C. and $0^{m}76$ pressure, may be called respectively 35·5 *criths*, 16 *criths*, and 14 *criths*. So again with reference to the compound gases, the relative volume-weight of each is equal to half the weight of its product-volume. Hydrochloric acid (HCl), for example, consists of 1 volume of hydrogen + 1 volume of chlorine = 2 volumes, or by weight, 1 + 35·5 = 35·5 units; whence it follows that the relative value-weight of hydrochloric acid gas is $\frac{36{\cdot}5}{2} = 18{\cdot}25$ units; which last figure therefore expresses the number of *criths* which 1 litre of hydrochloric acid gas weighs at 0° C. and $0^{m}76$ pressure, $18{\cdot}25 \times 0.0896 = 1{\cdot}6352$ as the actual weight in grammes of hydrochloric acid gas. Again, as the product-volume of water-gas (H_2O),* taken at the above temperature and pressure, contains 2 volumes of hydrogen + 1 volume of oxygen, and therefore weighs 2 + 16 = 18 units, the single volume of water-gas weighs $\frac{18}{2} = 9$ units, or subtituting as before the concrete for the abstract value, 1 litre of water-gas weighs 9 *criths;* that is to say, $9 \times 0{\cdot}0896$ gramme $= 0{\cdot}8064$ gramme."—"Op. cit." p. 131. In concluding this subject we will only further remark, that when a closely approximative result suffices, the crith may be estimated at 0·09 gramme.

2. Such terms as *atomic weight*, *atom*, and *molecule* are now employed in a stricter sense than formerly. Every element has been held from the time of Dalton to have a number called its atomic weight. This number, according to Dr. Frankland, one of our most distinguished modern chemists, is made to represent, as far as possible: "1*st*. The smallest proportion by weight in which the element enters into or is expelled from a chemical compound—the smallest weight of hydrogen so entering or leaving a chemical compound being taken as unity. 2*d*. The weight of the element in the solid condition at any given temperature contains the same amount of heat as seven parts by weight of solid lithium at the same temperature. 3*d*. The weight of the element which, in the form of gas or vapor, occupies, under like conditions of temperature and pressure, the same volume as one part by weight of hydrogen."—"Lecture Notes for Chemical Students" 1866, p. 2. Recent investigations have led chemists to assign to many of the elements double the atomic weights that were previously assigned to them. Thus, taking as formerly the atomic weight of hydrogen as the unit, the atomic weight, or, as it is now often styled, the *atomic number* of oxygen is changed from 8 to 16, that of carbon from 6 to 12, that of sulphur from 16 to 32; and this doubling is by the latest writers extended to most of the elements except the halogens, nitrogen, phosphorus, boron, the metals of the alkalies, gold, and silver. The old atomic weights are still recognised as *combining* or equivalent numbers. The reason why this doubling of the number has been adopted will be presently given. The distinction between an *atom* and a *molecule* must be clearly recognised. "We may define an *atom* of an elementary body to be the smallest proportional weight thereof which is capable of existing in *chemical combination;* and we may define the *molecule* of an elementary body to be the smallest proportional weight thereof which is capable of existing in the *free or uncombined state*." This, which is Hofmann's definition ("Modern Chemistry," p. 157), is now generally accepted. Thus a molecule (or *elementary molecule*, as it is often termed) may consist either of an isolated atom, or of a group of atoms.

The bulk of the molecule, or the *molecular volume* of an element in the gaseous or vaporous state, is the same as the molecular volume of hydrogen at the same temperature and pressure, and in a large number of cases the *molecular weight* of an element is twice its atomic weight. Dr. Frankland gives the following list of the elements whose molecular volumes have as yet been determined: The molecules of

* The reason why the formula H_2O, instead of HO, for water is used, will be presently explained.

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mercury, cadmium, and zinc contain *one* atom, and are termed *monatomic molecules*; those of hydrogen, oxygen, chlorine, bromine, iodine, fluorine, nitrogen, sulphur, and selenium contain *two* atoms, and are termed *diatomic molecules*; the molecules of oxygen, as ozone, contain three atoms, or are *triatomic*; while those of phosphorus and arsenic are *tetratomac*, and of sulphur under certain conditions are *hexatomic*. Thus an element, as in the cases of oxygen and sulphur, may, under different conditions, have two distinct molecular weights. We shall presently refer more fully to the subject of *atomicity*.

3. We shall now proceed to explain the reasons why many of the atomic weights have been doubled. "It is obvious," says Dr Odling, in his elaborate article on "Atomic Weights" in Watts's "Dictionary of Chemistry," vol. i. p. 456, "that the atomic weights of an element and of its combinations should be selected so as to express the entire series of combinations by the simplest series of formulæ: so as best to accord with the chemical properties and metamorphoses of the bodies; so as best to illustrate their analogies with other bodies; and so as to be in relation with their physical properties, such as their specific volumes, specific heats, isomorphism, &c." We shall endeavor to shew how he applies these views to prove that, in the case of oxygen, 16 parts of that element, or the quantity thereof which unites with 2 atoms of hydrogen, is the smallest proportion of oxygen that can enter into a combination. "We find, in the first place," says Dr Odling, "that the quantity of oxygen contained in the great majority of definite oxidised compounds must necessarily be represented by 16 or some multiple of 16 parts. Thus, the molecules of all hydrates, double oxides, acids, oxisalts, aldehydes, ketones, alcohols, oxacid-ethers, and a great number and variety of other compounds, doubtless forming together 99 per cent. of all known compounds of oxygen, cannot be represented save with 16 parts, or some multiple of 16 parts of oxygen. For example, the molecules of *hydrate of potassium*,* *benzoic aldehyde, acetone, chloral, hypochlorite of sodium*,* &c., each contain 16 parts of oxygen. The molecules of *spinelle, brown hæmatite, camphor, benzile, acetate of sodium*,* *benzoic acid*, &c., each contain twice 16 parts of oxygen. The molecules of *nitric acid, glycerin, chlorate of potassium**, *salicylic acid, augite*, &c., each contain three times 16 parts of oxygen." We need not carry the quotation further, it being sufficient to remark that Dr Odling gives similar lists of substances whose molecules each contain 4, 5, 6, 7, &c. times 16 parts of oxygen. Hence it follows that, when two bodies only differ in composition by the different proportions of oxygen which they contain, that difference amounts to 16 parts, or some multiple of 16 parts of oxygen. This is well shewn in the two following series of bodies given by Odling, in the former of which the symbols are arranged according to modern views:

KCl. Chloride of potassium.	C_4H_4 Ethylene.
$KClO_2$, Hypochlorite of potash.	$C_4H_4O_2$, Aldehyde.
$KClO_4$, Chlorite of potash.	$C_4H_4O_4$, Acetic acid.
$KClO_6$, Chlorate of potash.	$C_4H_4O_6$, Glycolic acid.
$KClO_8$, Perchlorate of Potash,	$C_4H_4O_8$, Glyoxylic acid.

It is obvious that in both these series each term differs from the preceding one simply by O_2, or 16 parts of oxygen. Again, the quantity of oxygen which can be liberated by any reaction, and which either alone or in the form of water can be added to or separated from a compound, must be 16, or some multiple of 16 parts. Thus each molecule of nitrate of soda ($NaO.NO_5$), when decomposed by heat, yields nitrite of soda (NaO,NO_3) and O_2 (or 16 parts of oxygen); similarly, each molecule of permanganate of potash, when decomposed by sulphuric acid, yields manganese—alum and O_4 (or twice 16 parts of oxygen); and each molecule of chlorate of potash (KO,ClO_5) is decomposed by heat into chloride of potassium (KCl) and O_6 (or three times 16 parts of oxygen). Again, water (and consequently its main constituent, oxygen) is always eliminated in double or some higher even atoms. Thus, formic acid ($C_2H_2O_4$) yields carbonic oxide (C_2O_2) and two atoms of water (H_2O_2); alcohol ($C_4H_6O_2$) yields olefiant gas (C_4H_4) and two atoms of water (H_2O_2); oxalate of ammonia (NH_3,C_2HO_4) yields cyanogen (C_2N) and four atoms of water (H_4O_4); and innumerable additional examples

* In these cases, one of the new forms of nomenclature is introduced,

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might be given. On these grounds (and many additional ones might be adduced if space permitted) it becomes obvious that if the vast majority of oxidised b dies were correctly formulated, they would be represented more simply by the formulæ in which O = 16 than by formulæ in which O = 8. Reasons of a similar nature have led to the duplication of the atomic weight of carbon, sulphur, and many of the other elements. There must obviously be some means of distinguishing when O indicates 8 or 16 parts of oxygen, C indicates 6 or 12 parts of carbon, &c. Various modes of distinction have been adopted by different chemists. In Watts's "Dictionary of Chemistry," now in the course of publication, the new atomic weights are represented by the same symbols which have hitherto been adopted for the old weights; while the latter (when they are occasionally introduced) are printed in italic capitals; thus, water is represented by H_2O in the new and by *HO* in the old system, acetic acid by $C_2H_4O_2$ in the new and by $C_4H_4O_4$ in the old system, &c. A more common means of indicating when the value of the symbol of an element is doubled in value is by drawing a horizontal bar through it, a notation due to Berzelius; Thus, $\bar{C}$, $\bar{O}$, $\bar{S}$ represent respectively an atom of carbon, of oxygen, and of sulphur in the new system. This system is useful in forming, as it were, a bridge to facilitate the passage from the old to the new system, and will gradually disappear when all chemists recognize the doubled atomic weights. Naquet, Miller (in the 3d edition of his "Chemistry," 1864), and others, adopt this *barred* system and the latter frequently gives the formulæ pertaining to both systems; for example, $FeO,SO_3.HO,6HO$, or $\bar{F}e\bar{S}\bar{O}_4.H_2\bar{O},6H_2\bar{O}$, represents the composition of the crystallised sulphate of protoxide of iron often described as protosulphate of iron.—"Inorganic Chemistry," 3d ed., p. 6. Some writers, as Frankland, in his "Lecture Notes for Chemical Students," 1866, following the plan of Watts and the contributors to his Dictionary, unreservedly adopt the doubled atomic weights, and represent them by the old formulæ; thus, O, C, and S represent in these works precisely double the weight of oxygen, carbon, and sulphur that these capitals represent in the 1st and 2d editions of Miller's "Chemistry," Fownes's "Manual of Chemistry," and other standard works published a few years ago. It is now customary for the writers of chemical papers who object to the barred symbols as being unscemly, to insert at the commencement C = 6, O = 8, or C = 12, O = 16, in order that the reader may be able to recognise which system is adopted.

Chemical Nomenclature is still in an unsettled state. The chemists of all countries are, with one notable exception, agreed as to the names and symbols which should represent the different elements. The French chemists persist in designating nitrogen by the name of *azote*, and of using Az instead of N for its symbol; and in Italy the term *azoto* is still employed, but as it is often coupled with the symbol N, it will probably soon be exchanged for the more general term nitrogen. When the elementary bodies unite together, they form a *binary compound*. The nomenclature of the binary compounds is in a transitional state. The compounds of sulphur with metals used to form *sulphurets*, latterly they have been termed *sulphides*, and now they are denominated after a third fashion; sulphuret of potassium (for example), after having been for some years sulphide of potassium, now being termed *potassic sulphide*. In order to obtain uniformity, the following rule is adopted by the representatives of the modern school. The names of binary compounds are formed from those of their constituents, the English or Latin name of the positive constituent with the terminal *ic* preceding that of the negative constituent, which is made to end in *ide*. Thus: potassium and sulphur form potassic sulphide; sodium and oxygen form sodic oxide (formerly soda or oxide of sodium); silver and chlorine form argentic chloride (formerly chloride of silver); lead and iodide form plumbic iodide (formerly iodide of lead); calcium and chlorine form calcic chloride (formerly chloride of calcium), &c. When the same elements form two compounds, the one which contains the smallest proportion of the negative element is distinguished by changing the terminal syllable of the name of its positive constituent into *ous*, while the terminal *ic* is retained for the compound containing the larger proportion of the negative element. Thus, 1 atom of iron and 1 atom of oxygen form *Ferrous oxide* (the old protoxide of iron); 2 atoms of iron and 3 atoms of oxygen form *Ferric oxide* (the old peroxide of iron). Sometimes the same lements form more than two compounds with one another, and then the prefixes *hypo* and *per* are employed. When a binary compound con-

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tains oxygen, and becomes an acid when made to unite with water, or becomes a salt when united to a base, it is termed an *Anhydride* (q. v.) or *anhydrous acid*. Thus 1 atom of carbon and 2 atoms of oxygen form *carbonic anhydride*, formerly known as carbonic acid gas; 1 atom of sulphur and 3 atoms of oxygen form *sulphuric anhydride*, &c. In a considerable number of cases, the trivial or common name has not been displaced by the new systematic name; thus water, ammonia, hydrochloric acid, phosphuretted hydrogen, sulphuretted hydrogen, &c., are not as yet replaced by hydric oxide, hydric nitride, hydric chloride, hydric phosphide, hydric sulphide, &c.; and soda and potash are still preferred by some chemists to sodic and potassic hydrates.

The term *acid* was originally applied only to substances which, like vinegar, possessed an acid taste; it is now made to include a large number of compounds which do not possess this property. The most general definition of acids is that of Gerhardt, which is adopted in Watts's "Dictionary of Chemistry"—namely, that "acids are salts of hydrogen." A more intelligible definition to ordinary readers is that which is adopted by Frankland, in which an acid is described "as a compound containing one or more atoms of hydrogen, which become displaced by a metal when the latter is presented to the compound in the form of a hydrate." Thus, using the new nomenclature and atomic weights, nitric acid and sodic hydrate yield sodic nitrate and water—

	Nitric Acid.		Sodic Hydrate.		Sodic Nitrate.		Water.
or,	NO_3H	+	$NaOH$	=	NO_3Na	+	H_2O,

in which reaction the hydrogen of the nitric acid is displaced by the sodium of the sodic hydrate (or soda), and as only *one* atom of hydrogen is displaced, nitric acid is said to be *monobasic*. When an acid admits of the displacement of two atoms of hydrogen, it is termed *dibasic*—as tartaric, oxalic, and, according to recent views, sulphuric acid; and when three atoms can be replaced—as in the case of common phosphoric acid, H_3PO_4, in which H_3 may be displaced by K_3 or Ag_3, the acid is termed *tribasic*. The nomenclature of the compounds of acids with bases is still unfixed. The names of the alkali-metals (potassium, sodium, and lithium) and alkaline-earth metals (barium, calcium, &c.) are now commonly substituted for those of their oxides in the nomenclature of the corresponding oxygen salts—as, for example, *carbonate of sodium* and *sulphate of calcium* for carbonate of soda and sulphate of lime. The names of these bodies are thus brought into uniformity with those of the salts of iron, copper, &c. In Watts's "Dictionary" and Frankland's "Lecture Notes" such compounds are denominated *sodic carbonate*, *calcic sulphate*, *sodic nitrate*, &c.; and these terms will doubtless soon be generally adopted for the metallic salts of the oxygen-acids generally. The nomenclature of complex inorganic bodies is founded for the most part, on the theory of types, the names of particular compounds being obtained from the name of the type by prefixing to it adjectives which express the nature of the element by which the hydrogen of the type is replaced and the number of atoms of it contained in one molecule of the compound. By way of illustration, we give a simple and a complicated example: $Bi\begin{cases}Cl\\O\end{cases}$ = bismuthic oxychloride, while $\begin{matrix}Hg_4\\H_4\end{matrix}\begin{cases}Cl_2\\O_2\\N_2\end{cases}$ = tetramercuro-tetrahydric dioxi-dichloro dinitride. The nomenclature of organic compounds is founded on the same principles as that of inorganic bodies; but our limited space prevents our entering into this subject.

Chemical Notation has been considerably altered by certain members of the recent chemical school; but on the whole, the modifications, since the time when the system of Berzelius was introduced into England in the third edition of Turner's "Elements of Chemistry," are not numerous. The most important are the introduction of "general formulæ" by Gerhardt, in which letters of variable value are used as coefficients instead of numbers, and Odling's method of denoting the atomicity of polyatomatic elements and radicals by means of accents placed above the symbols, which are then called dashed symbols. See TRIADS. Chemists are still at variance as to whether, when two or more atoms are represented in a compound, the figure indicating the repetition should be above or below the symbol; whether, for example, water should be represented by H^2O or H_2O, and alcohol by C^2H^6O or C_2H_6O. The *ordinary*

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or *dualistic* system, according to which the elements combine in couples to form compounds, which similarly unite by twos, led to the division of salts into two classes—viz., into salts composed of an oxygen acid and an oxygen base, which were hence called oxygen salts, as NaO,SO_3, and KO,NO_5, which in the old notation represent sulphate of soda and nitrate of potash; and binary or haloid salts, of which chloride of sodium, NaCl, is the type, which are formed by the union of the radical in hydrogen acids with some metal. Davy considered that the former class might be made similar to the latter by regarding them as composed of a metal and a compound radical having the same electro-negative chemical relations as the radicals in the hydrogen acids. According to this view, a radical, SO_4, not yet isolated, combines with hydrogen to form sulphuric acid, and with a metal to form sulphates, sulphuric acid being represented by H,SO_4, and sulphate of lime by Ca,SO_4. In like manner, nitric acid and the nitrates were supposed to contain a radical, NO_6. Against this view Gerhardt urges that we know nothing of the proximate constitution, but are merely acquainted with the ultimate composition of compounds. Hence we now no longer use a formula for sulphuric acid indicating its supposed constitution (HO,SO_3), but regarding it as a dibasic acid, express it, either as Miller does, by H_2 ~~SO_4~~ or by H_2SO_4, (where S = 32 and O = 16), or by $\left.\begin{matrix}SO_2\\H_2\end{matrix}\right\}O_2$, if we adopt the type-notation; and we must not omit that Frankland, who may be regarded as the leading representative of the English school of modern chemistry, represents it by the formula SO_2Ho_2, when Ho is the abreviated formula for HO, and represents a compound radical, to which he gives the name of hydroxyle, and which is commonly known as binoxide of hydrogen, being expressed, according to the old system, by HO_2. The following examples may enable the reader to pass from one system to another:

	Old System.	Barred System.	New Atomic Weights.	Frankland's Notation.
Sulphate of p'tas'm,	KO,SO_3	~~K_2SO_4~~	K_2SO_4	$So_2Ko.$
Sulphate of zinc,	$ZnO,SO_3.7HO.$	~~$ZnSO_4$~~$7H_2O$	$ZnSO_4.7H_2O$	$SOHo_2Zno''.6OH.$
Nitric acid,	HO,NO_5	HNO_3	HNO_3	$NO_2Ho.$
Nitrate of sodium,	NaO,NO_5	NaN ~~O_6~~	$NaNO_3$	$NO_2Nao.$

The Ko, Zno'', and Nao in Frankland's notation represent compound radicals, to which he has given the names potassoxyl, zincoxyl, and sodoxyl, and which are represented in the ordinary new notation by KO, ZnO_2, and NaO. These new names will probably soon get into general use in consequence of Frankland's great influence as the teacher of chemistry in the government School of Mines, and at the Royal Institution.* We must refer to the article TRIADS for a description of what is meant by *atomicity*, or, as Hofmann terms it, *quantivalence*, and the reader will do well to study Lectures 10 and 11 of his "Modern Chemistry." In the article just mentioned, we have stated that the degree of atomicity of an element is indicated by the number of dashes with which it is furnished. In the so-called *Graphic Notation*, which, in the hands of Kekulé, Crum Brown, Naquet, Frankland, and others, has proved a most valuable aid in explanation of the constitution of chemical compounds, the degree of atomicity of an atom is thus expressed: H' by , Zn'' by , B''' (boron) by , Civ by , Nv by , and Svi by . "No element, says Frankland, "either alone or in combination, can exist with any of its bonds disconnected; hence the molecules of all elements with an odd number of bonds are

*Another peculiarity of Frankland's notation is the introduction of thick letters (Egyptian capitals). His formulæ are so written as to denote that the element represented by the first symbol of a formula, and printed in this type, is directly united by attachment or *bonds* with the other elements or compound radicals

generally diatomic, and always polyatomic—i. e., they contain two or more atoms of the element united together. Thus:

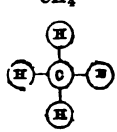
	Symbolic.	Graphic.
Hydrogen,	H′₂	
Chlorine,	Cl′₂	
Nitrogen,	N‴₂	
Phosphorus,	P‴₄	

An element with an even number of bonds can exist as a monatomic molecule, its own bonds satisfying each other. Thus:

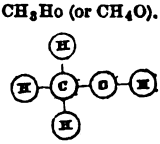
	Symbolic.	Graphic.
Mercury,	Hg″	
Zinc,	Zn″	

This graphic notation is most useful in fixing upon the mind the true meaning of symbolic formulæ, and in elucidating the internal arrangement of the very complex molecules which often occur in both mineral and organic compounds. It also affords an easy means of shewing the causes of isomerism in organic bodies. The following example will suffice to illustrate our meaning. The simplest of the alcohol family, methylic alcohol, is derived from marsh-gas by the substitution of one atom of Frankland's hydroxyl, Ho or HO (O = 16), for one of hydrogen.

CH_4 CH_3Ho (or CH_4O).



Marsh-gas.



Methylic alcohol.

The Classification of Organic Compounds has, during the last few years, been much improved. Until a comparatively few years ago, organic compounds were arranged, according to their most obvious properties, into acids, bases, fatty bodies, &c. Now the great majority of these compounds are arranged in series, of which each group differs from the preceding one by a fixed additional number of certain atoms. Thus (see Armstrong's "Organic Chemistry," pp. 143, 144) twelve alcohols are represented by the general formula $C_n H_{2n+2} O$ (new notation), the first being represented by CH_4O, and the others differing from it by an additional number of multiples of CH_2. Bodies of analogous properties thus united are termed *homolo-*

following the first symbol. Thus, to use his own illustration and notation, the formula. SO_2Ho_2 (sulphuric acid) signifies that the hexad atom of sulphur is combined with the four bonds of the two atoms of oxygen, and also with the two bonds of the two atoms of hydroxyl. (By hexad we mean an atom with six bonds, one of which is subsequently figured in the text.)

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gous. Again, every compound in a homologous series yields other compounds differing in composition from that from which they are derived, but yet bearing a different relation to it. Thus, alcohol yields ether, aldehyde, and acetic acid, and these so-called *heterologous* bodies form collateral series. This mode of classification is daily extending. It includes *the organic radicals*, such as methyl, ethyl, allyl, phenyl, cyanogen, &c.: the *hydrides of the compound radicals*, such as methylic hydride or marsh-gas, benzol, cyanic hydride or hydrocyanic acid, &c.; the *alcohols*, which form one of the most important of the families of organic compounds; the *aldehydes* and *ethers*, both of which are specially described; the *acids*, of which the monobasic acids alone include six series, amongst which are the acetic or fatty series, represented by the general formula $C_n H_{2n} O_2$, and containing 19 or 20 distinct acids, the oleic series, the lactic series, the benzoic or aromatic series, &c.—while the dibasic acids may be divided into four series, in which occur the succinic series, containing nine acids, most of which present several modifications, and the tartaric series; the *Anhydrides* (q. v.), of which those belonging to the acetic acid group may be arranged in series; the *ketones* or *acetones*; the compounds of nitrogen containing the *amines*, *amides*, *imides*, &c.; and, in short, excepting the natural alkaloids, the protein-compounds and their derivatives, the uric acid group, pigments, &c., there are few organic compounds which will not soon find a definite place in a series.

In this article we have strictly confined our remarks to the subjects bearing on general, and for the most part on theoretical chemistry. We may, however, allude, in conclusion, to two subjects which have undergone a great development during the last few years—viz., *Volumetric Analysis*, and the *Synthesis of Organic Bodies*, both of which are discussed in special articles.

The general tenor of this article shews that chemistry is at present in altogether a transitional state. As Professor Anderson, of Glasgow, observes in his address to the Chemical Section of the British Association in September 1867, the atomic theory, which, at the commencement of the present century, sufficed to explain all the facts of chemistry that were then known, is now quite inadequate to that end. At that time, chemists were acquainted with comparatively few compounds, and in these, oxygen was of such preponderating importance, that the science might have been almost termed "the chemistry of oxygen." Oxygen is now deposed from its high place, and is supplanted by carbon to such a degree, that one of the first living chemists has actually proposed for organic chemistry the name of "the science of the carbon-compounds." Facts gradually accumulated in the course of time which did not admit of explanation on the Daltonian theory; and as their number increased, such terms as catalysis, allotropy, &c., were invented, under which such facts were grouped together as were supposed to depend on similar causes. Such grouping may have certain temporary advantages, provided it is understood that, to use Professor Anderson's words, it is "the grouping of ignorance."

It is indeed obvious that a true theory of chemistry must be a part of a general theory of dynamics, and that until we obtain some more distinct idea of how the atoms are grouped in the molecules of substances (see ATOMIC THEORY) than we at present possess, the link connecting theoretical chemistry and theoretical dynamics is wanting. The doctrine of *Atomicity* evidently points to some general truth; it has been of great use in grouping together numerous facts, and in leading to investigations which have resulted in the discovery of many new facts and new generalisations, but we now want an explanation of this doctrine, and this chemistry does not appear to be able to give us. The want of a theoretical explanation does not, however, render a generalisation valueless, and much progress has been made of late years in ascertaining the "chemical structure" of substances;—that is, in obtaining graphic formulæ which consistently represent all the reactions by which the substances are formed or transformed. Before discussing the subject of chemical structure, it will be well to consider somewhat more fully than has been done above, the reasons why certain numbers have been selected for the atomic weights of the elements rather than any multiples or sub-multiples of them (see ATOMIC WEIGHTS). It was pointed out by Dulong and Petit that a close relation exists between the specific heat of a solid elementary substance and its atomic weight. Thus, if we take the old system of *Atomic Weights* (q. v.), and multiply the specific heat of each solid

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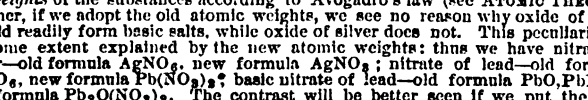
element by its atomic weight, we find that the elements form three groups. In the first, the product of specific heat into atomic weight, or *atomic heat*, varies from 6 to 6·6. In the second it varies from 3 to 3·3. In the third group, containing the allied elements, carbon, boron, and silicon, no regularity can be traced. By far the greater number of solid elements belong to the first or second group. Now it is plain that the atomic heat of a member of the first group is approximately double that of a member of the second group. But as the atomic weights are to a certain extent arbitrary, we can make the atomic heats of the two groups agree by doubling the atomic weights of the members of the second group. This was first proposed by the eminent Italian chemist, Cannizzaro, and has now been accepted by most chemists. These new atomic weights not only greatly simplify Dulong and Petit's law, but are also in harmony with many other facts, most of which were observed after the change had been made. Thus the formulæ of corrosive sublimate, bichloride of tin, and zinc methyl are, according to the old system, $HgCl$; $SnCl_2$; and ZnC_2H_3 and $H = 1$. According to the new system they are $HgCl_2$; $SnCl_4$; and ZnC_2H_6.

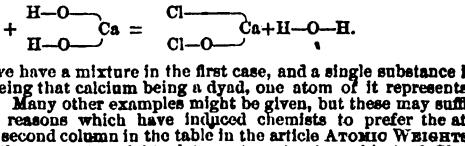
It will be at once observed that the second set of formulæ represent just twice the quantity represented by the first; now the second formulæ express the *molecular weights* of the substances according to Avogadro's law (see ATOMIC THEORY). Further, if we adopt the old atomic weights, we see no reason why oxide of lead should readily form basic salts, while oxide of silver does not. This peculiarity is to some extent explained by the new atomic weights: thus we have nitrate of silver—old formula $AgNO_6$, new formula $AgNO_3$; nitrate of lead—old formula $PbNO_6$, new formula $Pb(NO_3)_2$; basic nitrate of lead—old formula $PbO,PbNO_6$, new formula $Pb_2O(NO_3)_2$. The contrast will be better seen if we put the new formulæ into a graphic form.

Nitrate of Silver. Nitrate of Lead. Basic Nitrate of Lead.



We at once see the connection between the dyad character of lead (—Pb—), and the occurrence of basic salts.

Similarly we know that if we pass a current of chlorine gas into a cold solution of caustic potash, we obtain a *mixture* of chloride of potassium and hypochlorite of potash—$Cl_2 + 2KHO = KCl + KClO + H_2O$. But that if, instead of caustic potash, we take slaked lime, we obtain, not a *mixture*, but a single substance: $Cl_2 + CaH_2O_2 = CaOCl_2 + H_2O$. Putting the new symbols into a graphic form we have:



Where we see why we have a mixture in the first case, and a single substance in the second, the reason being that calcium being a dyad, one atom of it represents two atoms of potassium. Many other examples might be given, but these may suffice as an indication of the reasons which have induced chemists to prefer the atomic weights given in the second column in the table in the article ATOMIC WEIGHTS.

Assuming, then, these atomic weights, let us return to the subject of *Chemical Structure*. This may be defined in various ways, but most conveniently as the indication by a graphic formula, or something equivalent to it, of all the chemical changes by which the substance can be formed or decomposed. This will best be illustrated by means of a few examples, and we shall select these from among organic compounds—that is, compounds of carbon, because the structure of these compounds has been most fully investigated.

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Ascetic acid has (on the new system, which will be exclusively used in the remainder of this article) the formula $C_2H_4O_2$. If it is treated with caustic potash, it yields acetate of potash according to the equation $C_2H_4O_2 + KHO = C_2H_3KO_2 + H_2O$. Here one atom of hydrogen has been replaced by one atom of potassium, and we find that further treatment with caustic potash does not cause any further replacement of hydrogen by potassium. We may therefore write the formula of acetic acid thus: $H—(C_2H_3O_2)$, and this formula indicates the replaceability of one atom of hydrogen by metal, and explains (as far as such formulæ can *explain* anything) the occurrence of such compounds as acetate of lead $(C_2H_3O_2)—Pb—(C_2H_3O_2)$, and all the other acetates. The question now remains, what is the structure of the group $(C_2H_3O_2)$, which is united in acetic acid to hydrogen, and in the acetates to metal?

To answer it we must examine some other reactions of acetic acid. When treated with pentachloride of phosphorus, it loses an atom of oxygen, the place of which is taken by two atoms of chlorine—the pentachloride of phosphorus taking the oxygen in exchange for the chlorine; but instead of obtaining a compound $(C_2H_4OCl_2)$, we find that the result is expressed by the equation: $C_2H_4O_2 + PCl_5 = C_2H_3OCl + HCl + POCl_3$. We thence conclude that in acetic acid the atom of dyad oxygen removed in the action given above was united to an atom of hydrogen, and to the group (C_2H_3O), and represent the change thus:

$$(C_2H_3O)—O—H + PCl_5 = (C_2H_3O)—Cl + Cl—H + POCl_3;$$

the replacement of the dyad oxygen by two atoms of the monad chlorine necessitating the falling asunder of the compound. The reactions of chloride of acetyl (C_2H_3OCl) lead us to the further conclusion that the atom of hydrogen replaceable by metal is the atom not present in chloride of acetyl, so that the formula $(C_2H_3O)—O—H$ is a fuller and more explanatory form of $(C_2H_3O_2)—H$. Again, if we heat acetate of potash with caustic potash, we have marsh gas (CH_4) given off, and the residue consists of carbonate of potash

$$(C_2H_3O)—O—K + K—O—H = H—\underset{\displaystyle H}{\overset{\displaystyle H}{C}}—H + K—O—\overset{\displaystyle O}{C}—O—K;$$

and this decomposition can only be represented if we give acetic acid the formula $H—\overset{\displaystyle H}{\underset{\displaystyle H}{C}}—\overset{\displaystyle O}{C}—O—H$;

when we have

$$H—\overset{\displaystyle H}{\underset{\displaystyle H}{C}}—\overset{\displaystyle O}{C}—O—K + K—O—H = H—\overset{\displaystyle H}{\underset{\displaystyle H}{C}}—H + K—O—\overset{\displaystyle O}{C}—O—K;$$

the dotted lines separating in the diagram the symbols of the parts of the molecules which change places.

We have considered only a few of the reactions of acetic acid, but the formula just given is equally consistent with all the others. It is therefore said to exhibit the *structure* of acetic acid. This word "structure" is perhaps a little misleading—we must recollect the precise sense in which it is used, as a concise representation of many reactions. It is conceivable that it may have some relation to the actual relative position of the atoms in a molecule of acetic acid, but we have not as yet any means of ascertaining whether this is so or not.

We may illustrate the meaning of chemical structure further by a somewhat more complex case. Asparagine, a colorless crystalline substance extracted from asparagus, and also from the blanched shoots of other plants, has the composition expressed by the formula $C_4H_8N_2O_3$. When treated with caustic potash it yields ammonia and a body called aspartate of potash

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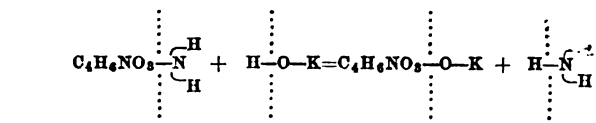
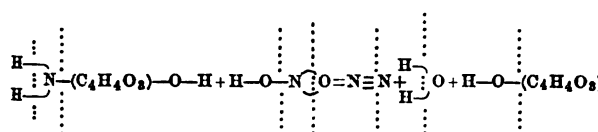
—the potash salt of aspartic acid. The change is obviously an exchange of

K—O— and —and may be thus indicated:



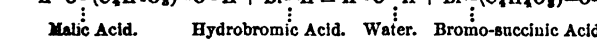
Aspartic acid is then $(C_4H_6NO_3)$—O—H, and we have to study its decompositions in order to discover the structure of the group $(C_4H_4NO_3)$. Now, aspartic acid is attacked by nitrous acid, and the products are nitrogen gas, water, and malic acid, thus: $C_4H_7NO_4 + HNO_2 = C_4H_6O_5 + N_2 + H_2O$. Here we have the triad nitrogen of the aspartic acid replaced by the dyad O, and the monad group —O—H of the nitrous acid, and this leads to the formula

—$(C_4H_4O_3)$—O—H for aspartic acid. The equation above thus becomes:



Aspartic Acid. Nitrous Acid. Nitrogen. Water. Malic Acid.

When malic acid is treated with hydrobromic acid, we obtain water and bromo-succinic acid:

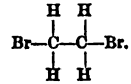


Malic Acid. Hydrobromic Acid. Water. Bromo-succinic Acid.

and we can prove that the group H—O—, here replaced by Br, is that one which in

aspartic acid is represented by —. Bromo-succinic acid, when treated with nascent hydrogen, has its bromine removed and hydrogen put in its place, thus yielding succinic acid $(C_4H_6O_4)$. We shall most easily arrive at the structure of succinic acid by studying its synthesis.

Olefiant gas (C_2H_4) unites with bromine to form a liquid having the composition $(C_2H_4Br_2)$, and (as can easily be proved by its relation to glycol and glycollic acid), a structure represented thus:



This bromide of ethylene, as it is called, when treated with cyanide of potassium, gives bromide of potassium, and a substance which may be called cyanide of ethylene—bromine and cyanogen changing places $(C_2H_4Br_2) + 2KCN = C_2H_4(CN)_2 + 2KBr$. As cyanide of potassium is K—C≡N, it follows that cyanide of ethylene is

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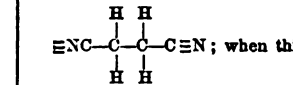
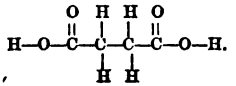
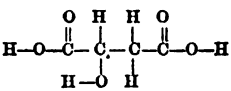


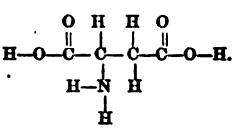
; when this product is boiled with caustic potash and water ammonia, is given off, and succinate of potash remains in solution. Here we have nitrogen uniting with hydrogen, while the place of the nitrogen is taken by that with which the hydrogen was united—viz., the dyad O, and the monad —O—K. We thus obtain the structural formula of succinic acid.



Here are obviously two hydrogen atoms having a different function from the rest—those, namely, which are replaceable by metal, and which in the above formula are represented as directly united to oxygen. That it is not one of these that is replaced by bromine, follows from the fact that bromo-succinic acid has also two atoms of hydrogen replaceable by metals in exactly the same way as in succinic acid itself, and as the other four items of hydrogen do not differ in position in the diagram from one another, we have only one possible formula for bromo-succinic acid; and therefore, for malic acid:



and for aspartic acid:



We have, however, two possible structural formulæ for asparagine, as it is plain that the two groups H—O— in aspartic acid are not similar to one another, and we have not as yet any means of deciding between them. The reader will see that they are different, and from the way in which structure has been proved, will also see that reactions may be obtained which would decide between the two.

It is not necessary to give any further examples of chemical structure.—The two we have treated in some detail may suffice to shew how the principle is applied, and what is the nature of the evidence in favor of particular structural formulæ.

CHE'MISTS and Drug'gists, Laws relating to. Under the head APOTHECARY (q. v.) will be found the distinction between that profession and the kindred one of Pharmaceutical Chemist. The Pharmaceutical Society of Great Britain, founded in 1841 for raising the standard of efficiency in the practice of dispensing and compounding drugs, was incorporated by royal charter in 1848. An act was passed in 1852 defining the qualifications of pharmaceutical chemists, and the society's powers for examining and granting qualifying certificates. The Pharmacy Act of 1868, referred to below, still further defines its duties and privileges. As in the case of medical practitioners, there is no penalty for mere practice; but the assumption of the specific title named in the act is punishable by fine. The legislature presumes that certificates obtained by examination are evidence of efficient education, but that the freedom of engaging in business ought not to be interfered with; and that the right of the subject to consult whom he chooses, or to buy drugs from whom he will, must be respected. This seems a sound view. Serious mistakes, such as the substitution of one medicine for another, to the injury of the purchaser, are punishable by law, both in the un-

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qualified and in the case of those qualified under the act. The public also derives great and increasing security in this and in all other departments of human enterprise, from the improving effect of free competition. The operation of the act was simply that of indicating to the public, by a name or title, a class of druggists possessing a higher education. In 1868, it was deemed necessary, owing to the frequent evils arising from the facility of obtaining poisons, to enact that no person should sell, or keep open shop for selling poisons, or assume or use the title of chemist or druggist or pharmacist, unless he be registered under the Act 31 and 32 Vict. c. 121, amended by 32 and 33 Vict. c. 117, and conform to the regulations as to sale of poisons. All persons who in 1868, carried on the business of chemists and druggists, and their apprentices and assistants, were entitled to be registered. The register of chemists and druggists under this act now contains the names of all qualified persons in Great Britain.

CHE'MITYPE is the name given by its inventor, C. Pūl, a Dane, to the art of producing on a metal plate, by a chemical process, an engraving in relief. The outline of the process is this: On a polished plate of zinc an etching or an engraving is made in the usual way. The depressions of this design are then filled up with a melted metal—the nature of which is not revealed—and this superadded metal is then reduced to the exact level of the zinc, so that the design now appears as if inlaid. An acid is next applied to the surface, which attacks the zinc without affecting the inlaid metal; and thus there results an exact copy in relief of the original intaglio engraving. In competition with wood-cuts, relief-lithographs, and copper-plates, C. does not seem as yet to evince any great superiority; it fails especially in that character of strength and softness which wood-cuts express so well. The prints produced by this art look more like engravings than like wood-cuts. They have this advantage, however, that they give an exact copy of the original design made by the artists on the metal; whereas in wood-cutting the drawing made on the block may be impaired in its effect by the engraver. C. is particularly adapted for producing maps by the common printing-press. Pūl practised his invention at first on a small scale in Copenhagen, from 1843 to 1846, and then extensively in Leipsic. In 1850, he went to Vienna, where he was employed in the imperial printing-establishment.

CHE'MNITZ, a town of Saxony, is situated at the base of the Erzgebirge, and at the confluence of the river Chemnitz with three other rivers, in lat. 50° 50′ n., and long. 17° 55′ e. It is the principal manufacturing town of Saxony—its industry consisting in weaving cottons, woollens, and silks, and in printing calicoes, chiefly for German consumption. Cotton stockings are a most extensive manufacture, and rival the British in quality and cheapness. The American markets are chiefly supplied from this place. It has several extensive machine-factories, producing machinery for flax and wool spinning, weaving and mining industry. Amongst the numerous educational institutes of C. are schools of weaving, mining, and tailoring. For four centuries, C. was a free imperial city. Traces of its antiquity are seen in many of the buildings. Pop. (1875) 85,334.

CHEMNITZ, Martin, next to Luther and Melancthon the most distinguished German Protestant theologian of the 16th c., was born at Treuenbrietzen, in Brandenburg, 9th November 1522; studied at Frankfurt and Wittenberg; and, in 1548, became rector of the cathedral-school of Königsberg. About 1550, he began to devote himself seriously to theology, and in 1553 went back to Wittenberg, where he delivered prelections on Melancthon's "Loci Communes," from which sprang his own "Loci Theologici," which, for method and learning, excels all similar books of the same age. In 1554, he was made a preacher in Brunswick, where he wrote his "Repetitio Sanæ Doctrinæ de Vera Presentia Corporis et Sanguinis Domini in Cœna Sacra" (Leip. 1561), in which he defended Luther's view of the Lord's Supper against that of the Swiss reformers; the "Theologiæ Jesuitorum Præcipua Capita," (Leip. 1562); and the "Examen Concilii Tridentini" (Leip. 1565), a work in which h has argued with remarkable acuteness and learning against the dogmas of the Church of Rome. His "Corpus Doctrinæ Prutenicæ" (1566), written in conjuction with Mörlin, became a standard work of divinity among the Prussian Protestants. But his greatest ecclesiastical achievement was inducing the Saxon and Swabian churches to adopt as their confession of faith the *Concordienformel*,

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and thus extending and consolidating the creed of Luther. He died at Brunswick 8th April 1586.

CHEMNI'TZIA, a genus of gasteropodous mollusca. It has a slender, elongated, many-whorled shell; the whorls striated; a simple semi-oval aperture; and a horny operculum. There are many recent species scattered all over the world. The discriminating characters of the fossil species being taken from the form of the shell, it is more than probable that the remains of very different animals are classed under this generic name. No less than 160 species have been described, occurring throughout all the divisions of the fossiliferous strata from the Lower Silurian upwards.

CHENA'B, the largest, according to general opinion, of the five rivers which give name to the Punjab. Like most of the principal streams of India, it rises to the north of the Himalayas, making its way through the Ritanka Pass at the height of 13,000 feet above the sea, and having its source about lat. 32° 48' n., and long. 77° 27' e. After a descent of 300 miles, the C. reaches the level country. At the close of a course of the same length, it receives, on its right, the Jhelum in lat. 31° 12' n., and long. 72° 12' e.; 50 miles further down, it is joined, on its left, by the Ravee; and 110 miles lower, it absorbs, through the Ghara on its left, the mingled waters of the Beas and the Sutlej. Lastly, at a distance of 60 miles, the accumulated floods, under the designation of Punjnud, lose themselves in the Indus in lat. 28° 55' n., and long. 70° 28' e.—being still 470 miles from the ocean.

CHENOPODIA'CEÆ, or Salsola'ceæ, a natural order of exogenous plants, consisting of herbaceous and half shrubby plants, with leaves entire or divided, and destitute of stipules. The flowers are inconspicuous, hermaphrodite, or unisexual; the perianth deeply divided, persistent; the stamens inserted into its base, opposite to its segments, and equal to them in number, or fewer; the ovary single, free, or occasionally adhering to the tube of the perianth, with a single ovule attached to the base of the cavity; the style generally with 2—4 divisions. The fruit is membranous, enclosed in the perianth, which sometimes become fleshy. The seed has a curved or spiral embryo.—There are about 360 known species, most of which have a weed-like appearance, and grow in waste places. They are widely diffused over the world, but are particularly abundant in the northern parts of Europe and Asia. Beet and spinage are among the best known and most useful plants of the order. Many are occasionally used as pot-herbs, as some species of *Chenopodium* and of orache. The fruit of Strawberry Blite (*Blitum Capitatum* and *B. virgatum*), a common weed in the south of Europe, has some resemblance in appearance to a strawberry, from the coherence of the fleshy perianths of a whole spike or head of flowers, and a sweetish, insipid taste. The seed of Quinoa (q. v.) is used for food as a kind of grain. Some of the C. are aromatic (see CHENOPODIUM). Some inhabit salt marshes, and abound in soda, as the Saltworts (q. v.).

CHENOPO'DIUM, a genus of plants of the natural order *Chenopodiaceæ*, of which some of the native British species are well known by the name of GOOSEFOOT, as weeds growing in gardens, on heaps of rubbish, and in waste places. The species are mostly annuals, with entire or toothed leaves, which, in some of them, have a sort of mealy hoariness. They are mostly natives of Europe, and of the temperate parts of Asia; but some are natives of America, into which, however, some of the common European species have found their way, and are naturalised as weeds. The genus has hermaphrodite flowers, with perianth of five small green scales, five stamens, and solitary flat seeds. The leaves of many species are used as a substitute for spinage, particularly those of the GOOD HENRY, WILD SPINAGE, or ENGLISH MERCURY (*C. Bonus Henricus*), a perennial plant, native of Britain and other parts of Europe, often found growing by waysides, with stem more than a foot high, powdered with minute transparent globules, and large, alternate, triangular, arrow-shaped, entire leaves. It is cultivated in some places, particularly in Lincolnshire, chiefly for the leaves, but the young shoots are also used as asparagus. *C. intermedium*, *C. album*, &c., annuals, common in waste places, are also excellent substitutes for spinage. *C. olidum* or *vulvaria* (STINKING GOOSEFOOT), an annual with an extremely nauseous odor, growing in waste places in Britain, &c., especially near the sea, is a popular medicine, in much repute as an antispasmodic and emmenagogue. *C. Botrys*, a native of the south of Europe, with pinnatifid leaves resembling those of the oak, and hence called JERUSALEM OAK, is in use as an ex-

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pectorant and anthelmintic. It is not fetid like the species last named, but agreeably fragrant. *C. Ambrosioides* has a strong aromatic odor, is used in Mexico instead of tea, and is much cultivated in France, an infusion of it being deemed useful in nervous disorders. *C. anthelminticum*, the WORMSEED of the United States, has a strong and somewhat aromatic odor, and a high reputation as a vermifuge. Its seeds are chiefly used, or the essential oil extracted from them, called *Oil of Wormseed*. More important than any of these species, as affording a principal article of food in the countries of which it is a native, is QUINOA (q. v.).

CHE'PSTOW, a river-port in the south-east of Monmouthshire, on the right bank of the Wye, 2½ miles from its junction with the estuary of the Severn, and 14½ miles east-north-east of Newport. It lies between bold cliffs, on a slope rising from the river, in the midst of beautiful and grand scenery. There is a fine view from a rock called Windcliff, 970 reet high, three miles and a half up the river. The streets are broad. Here occurs the highest tide in Europe, rising suddenly, with a fierce current, often 50, and on rare occasions even 70 feet. Large vessels reach the town. One of the wells of the town ebs and flows with the tide. Over the Wye is a railway bridge combining the suspension and tubular principles of construction. C. has a magnificent castle, built in the 11th c., and a fine Benedictine priory recently restored. It has few manufactures, but exports corn, cider, bark, iron, millstones, timber, and salmon. Pop. (1871) 3347. In 1875, 1013 vessels, of 31,586 tons, entered and cleared the port.

CHEQUE, is a money order on a banker or other party having funds of the drawer. It must bear a penny stamp, and is payable to bearer on demand. If not presented within a reasonable time the holder shall have no claim against the drawer should the banker fail. The banker bears the risk of forgery, unless facilitated by carelessness in drawing. A. C. is held as payment of a debt until dishonored on presentation; it is not payable after the drawer's death.

CROSSED CHEQUE is an ordinary C. with two transverse lines drawn across it, which has the effect of making it payable only through a banker. When a particular banker's name is written between the lines the C. is said to be *specially* crossed, and is only payable by the banker whose name it bears. Wanting a particular name, it is said to be *generally* crossed, and is payable through any banker. An ordinary C. may be crossed either generally or specially by the holder. Obliteration of the crossing or any alteration of a cheque, except as provided for by the Crossed Cheques Act (1876) is felony.

CHER, a tributary on the left side of the river Loire, rising near Crocq, in the department of Creuse; flows first north by Auzances, Evaux, Montluçon, and St Amand; then north-west through the department of Cher by Vierzon; then westward by Selles, Montrichard and Blére to the Loire, which it joins below Tours. Its whole length is about 200 miles, and it is navigable for the last 47 of its course. CHER, the central department of France, to which the above river gives its name, is situated in lat. 46° 25'—47° 39' n., and in long. 1° 55'—3° 10' e. The surface is mostly level, traversed by well-wooded elevations, and produces corn, fruits, wine, hemp, flax, &c. The climate is mild and pleasant. Agriculture and pasturage of cattle are both capable of improvement. Area, upwards of 2800 square miles. Pop. (1872) 335,392. C. is divided into the three arrondissements—Bourges, St Amand, and Sancerre. Bourges is the chief town.

CHERA'SCO, a town in the province of Cuneo, N. Italy, situated on the Tanaro, 30 m. s.e. of Turin. It has manufactures of silk, and a pop. of (1871) 4694. A peace was concluded here between Louis XIII. of France and the Duke of Savoy in 1631. On April 26, 1796, the place was taken by the French; and here, three days after, the "Armistice of Cherasco" was concluded between the Sardinian commissioners and Napoleon, by which the latter obtained the right of free passage for his troops through the Sardinian States; and the treaty that followed gave to the French republic Savoy, Nice, and the possessions of Piedmont to the westward of the Alps' highest ridge.

CHERBOURG, a fortified seaport town and arsenal of France in the department of Manche, is situated at the head of a deep bay on the northern extremity of the peninsula of Cotentin, on the English channel, and opposite the west coast of the Isle of Wight, in lat. 49° 40' n., and long. 1° 35' w. Napoleon I. began to build the

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great defences of this northern stronghold of France. His nephew, Napoleon III. developed his plans, but not with the original view of an invasion of England. Occupying a prominent position on the French coast, only some 60 miles removed from the south shore of England, the harbor-works have been extended, strengthened, fortified, and provisioned with cannon—the dock-yards improved, and facilities of embarkation afforded, to a degree that, as it is unparalleled in ancient or modern times, not unnaturally excites the lively apprehension of Englishmen. A description of the stupendous breakwater of C., enclosing a space of nearly 2000 acres, will be found in the article BREAKWATER. In connection with its fortifications, this breakwater assumes an importance that attaches to no other work of the kind in existence. At the apex of the angle formed by the meeting of the two branches of the breakwater or *digue*, there is a centre fort or battery, measuring 509 feet on the inner line of the parapet, which forms a flat semi-ellipse. The circular forts at the extremities of the breakwater are remarkably well placed for purposes of defence. Behind the centre battery there is to be an elliptical tower, measuring 225 feet on the major, and 123 feet on the minor axis. Altogether there are six large batteries on the mole. The entrances to the harbor are round the ends of the mole; and the passages are further defended by the fortifications of the Ile Pélée, and by the batteries of La Roche Chavaignac and Fort Querqueville. A series of coast redoubts, and the two large fortifications of Les Roches des Flamands and du Homet, are situated behind this outer zone of defence. "The arsenal," says Mr W. H. Russell, who visited C. during the summer of 1860, "is enclosed by a continuous line of bastion and curtain of a very elevated profile, defended by outworks, wet and dry ditches, and by profuse batteries of the heaviest guns, either in casements or *en barbette*. Wherever you look, you fancy that on the spot you occupy are specially pointed dozens of the dull black eyes from their rigid lids of stone." Altogether, besides the batteries on the mole, C. is defended by 24 regular forts and redoubts. The town itself is commanded by La Roule (an exceedingly strong fort) and Fort d'Octeville on the heights behind. The military port of C. consists of an outer harbor of 776 feet in length by 663 feet wide, its minimum depth being 59 feet, and the entrance to which is 206 feet wide at its narrowest point. This harbor communicates by means of a lock with a floating basin, 957 feet long by 712 wide. The outer harbor has four building-slips for 120-gun ships, besides some smaller slips, and a fine graving-dock. In August 1858, an inner floating-harbor was inaugurated by the Emperor of the French, in presence of the Queen and many of the Lords and Commons of Great Britain. This harbor, entirely cut out of the solid rock, has a length of about 930 yards, and a breadth of 437 yards, and is surrounded by beautiful building-slips and capacious graving-docks. It is calculated that the roads of C. cannot, on account of the small depth of the greater portion, shelter more than 25 or 30 sail of the line, and about as many frigates, at one time. C. has a commercial port quite distinct from the other, situated on the south-east; but it displays little activity, the principal exports being eggs, butter, and cattle. The town itself is insignificant, the streets being narrow and dirty; and there are no public buildings of note. There are some manufactures of hosiery, chemicals, lace, and leather, and sugar and salt refineries; but the industrial energies of the great bulk of the population are absorbed in the arsenal and dock-yards. C. is a very ancient place; in the 10th c. it was known under the name of *Carusburg*. In 1758, C. was taken by the English, who destroyed the naval and military works, and levied a contribution on the town. Pop., exclusive of naval and military forces, (1872) 26,144.

CHE'RIBON, or Sheribon, a seaport town of Java, situated on the north coast 125 miles east-south-east of Batavia. It has a considerable trade in coffee, indigo, and teak-wood, and is the residence of a Dutch governor. Pop. 11,000.

CHERIMOY'ER, or Chirimoya (*Anona Cherimolia*), the most esteemed fruit of Brazil and Peru, now common, and even naturalised in some parts of the East Indies, and other tropical countries of the Old World. It is a fruit of most delicious flavor, is sometimes described as the finest of all fruits, and sometimes as inferior only to the mangosteen. It belongs to the same genus with the Custard Apple (q. v.). Both flowers and fruit emit a pleasant fragrance, but when the tree is cov-

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ered with blossom, the odor is so strong as to be almost overpowering. The fruit varies from the size of an orange to 16 lbs. or upwards in weight. It is roundish, or heart-shaped. Externally, it is greenish, covered with small knobs and scales. The skin is rather thick and tough. Internally, the fruit is snow-white and juicy, and contains a number of small brown seeds. The eatable part is soft like a custard, and forms almost the entire mass of the fruit. The C. attains its highest excellence only in particular soils and situations, and some varieties are much finer than others. No tropical fruit seems better to deserve a higher degree of attention than it has yet received in our hot-houses.

CHERKA'SK. See TCHERKASK.

CHE'RRY (*Cerasus*), a genus or sub-genus of plants, of which the best known yields one of our most esteemed stone-fruits. This is usually regarded as a sub-genus of *Prunus* (see PLUM), but is erected by some botanists into a distinct genus on very slender grounds, the most obvious distinction between the species of *Cerasus* and the true species of *Prunus* being that, in the former, the young leaves are conduplicate, or folded up, and in the latter they are convolute, or rolled together. Two species are pretty generally regarded as the parents of the garden cherries usually cultivated, *Prunus* or *Cerasus Avium*, and *P. cerasus* or *C. vulgaris*—the former having the underside of the leaves hairy and a small austere fruit; the latter having smooth shining leaves and a more juicy fruit. *C. Avium* attains a height of 40—50 feet. *C. vulgaris* is a smaller tree. Both have white flowers in clusters or nearly sessile umbels, and both are generally regarded as natives of Britain, and of the middle and south of Europe. In a wild state they are usually called GEAN (*guigne*), and *C. Avium* is frequently planted—not only because it is exceedingly ornamental when in flower, but also as a timber-tree, being of rapid growth, with firm, strong, close-grained wood, suitable for the purposes of cabinet-makers, turners, and musical-instrument makers. But according to some botanists, there is only one species, of which these are varieties; and according to others, *C. vulgaris* is a native of Syria and other parts of Western Asia, and is only naturalised in Europe, having been first brought to Italy by Lucullus, after his victory over Mithridates (74 B. C.), from Kerasunt, on the coast of the Black Sea, from whence it derives its name. The cultivated varieties of the C. are very numerous, and differ very considerably in size, color, and flavor. The fruit of the C. supplies the inhabitants of some parts of France with a principal article of food, especially the wood-cutters and charcoal-burners of the forests; and among their modes of preparing it is that of making it a principal ingredient in soups. It ripens in Norway and East Bothnia as far north as lat. 63°. In some parts of Germany, the public roads are lined for many miles together with avenues of C. trees. Besides its use for the dessert and for preserves, the C. is extensively used for making liqueurs. See KIRSCHWASSER and MARASCHINO. Varieties of C. with double flowers, and with pendulous branches, are frequently planted for ornament in shrubberies, and few trees or shrubs are more beautiful. The *All-saints C.* produces flowers almost all summer, and even in autumn. Its fruit is small and rather acid. The other species of C. are numerous. Some species are low, or even prostrate shrubs, as *C.* or *P. chamæcerasus* the GROUND C. of the South of Europe and of Sideria; and the *C.* or *P. pumila*, the SAND C. of North America.—The genus or sub-genus *Cerasus* contains also the different kinds of Bird C. (q. v.) and Choke C. (q. v.), including the American WILD C., famous for its medicinal bark; the MAHALEB (*C.* or *P. Mahaleb*) of the south of Europe, and the CAPOLLIM (*C.* or P. *capollim*) of Mexico and Peru—the first famous for the fragrance of its flowers, and the second for the fragrance of its fruit; and the CHERRY-LAUREL (q. v.).

CHE'RRY-LAUREL, or Lau'rel-Cherry, a name given to those species of *Prunus* or *Cerasus* (see CHERRY) which have evergreen leaves. They are also often called LAUREL. They have small flowers in long racemes, and small fruit; the fruit of a nauseous taste; and most parts of the plant, but particularly the leaves and kernels, remarkably abounding in hydrocyanic (prussic) acid, and therefore very poisonous.—The COMMON C., sometimes called the BAY-LAUREL or LAUREL-BAY, very often spoken of simply as the LAUREL or COMMON LAUREL (*Prunus* or *Cerasus, Lauro-cerasus*), is a shrub, sometimes of very large size, with ovato-lanceolate, convex, smooth, remotely serrated, shining, yellowish green leaves, and

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erect racemes of flowers. It is originally from Asia, but is now naturalised throughout the south of Europe, and is one of the most common ornamental shrubs in Britain, where it suffers only from such severe frosts as are of rare occurrence. It is propagated by seeds, layers and cuttings. Its leaves resemble bitter almonds in smell and taste, and contain in great abundance the same essential oil (see ALMONDS, VOLATILE OIL OF), rich in hydrocyanic acid. From these leaves, by maceration in water for 24 hours, and subsequent distillation, is obtained the *Laurel-water* (q.v.) or *Cherry-laurel water*, sometimes employed in medicine as a substitute for hydrocyanic acid, and which formerly was so much used as a poison. The leaves are sometimes employed also for flavoring puddings, sauces, etc., and are safer for such purposes than oil of bitter almonds, but ought to be used with caution.—Another species, also very common as an ornamental shrub in Britain, but not quite so hardy as the common C., is the PORTUGAL LAUREL (*Prunus* or *Cerasus Lusitanica*), a native of Portugal, a large shrub—sometimes a tree—with dark-green leaves and lateral racemes. It does not grow so well under the shade of trees as the common cherry-laurel. From the dissimilarity of form and color of their leaves, these species present a pleasant appearance, when mixed, as they usually are, in the shrubbery.

CHE'RSO, an island of Illyria, belonging to Austria in the Adriatic, 12 miles south-south-west of Fiume. A bridge unites it with the adjoining isle of Lossini. It has an area of about 105 square miles, with a population of (1869) 14,000. Its surface is generally hilly and rugged, with forests in the north. The chief town is Cherso, at the head of a bay on the west side. Pop. (1869) 7590.

CHERSO'N. See KHERSON.

CHERSONE'SUS, the ancient name of several peninsulas and promontories in Europe, the most important of which are the Crimea (q. v.), *C. Taurica*; Gallipoli (q. v.), *C. Thracia*; and Jutland (q. v.), *C. Cimbrica*.

CHERT, or Ho'rnstone, a variety of quartz, always massive, and having a kind of granular appearance and structure. It is common in the Mountain Limestone, Oolite, and Green-sand formations; sometimes forms rocks; and often contains petrifactions. It passes into common quartz and chalcedony, also into flint and flinty slate. Its colors are gray, white, red, yellow, green, or brown. The name C. is sometimes limited to the finer varieties, and the coarser are called Hornstone. —The name C. is very commonly given to the silicious concretions which occur as nodules and layers in limestone rocks, like flints in the chalk. When these materials exist to such an extent as to render the limestone useless for economical purposes, it is said to be "cherty."

CHE'RTSEY (Anglo-Saxon, Ceort's Eye or Island), a town in the county of Surrey, on a low strip of land between the right bank of the Thames, here crossed by a stone bridge, and the brook from Virginia Water, 20 miles west-south-west of London. It is irregularly built, chiefly consisting of two long cross-streets, and is surrounded by villas. The chief trade is in malt and flour. Many vegetables are raised for the London market. Pop. (1871) 3146. C. arose in a monastery founded in 666, and rebuilt in 964 by Edgar and the Benedictine monks. The South Saxon kings had a seat here during the heptarchy. Charles James Fox lived on St Anne's Hill, an abrupt elevation about a mile from the town. Cowley the poet resided in Chertsey.

CHE'RUB, in the plural *Cherubim* or *Cherubs*, is the Hebrew name of a winged creature with a human countenance, which in the Scriptures is almost always represented in connection with Jehovah, and especially as drawing his chariot-throne. Cherubim are first mentioned in the Old Testament as guards of paradise; a C. with a flaming sword hindered the return of the expelled human pair. In the Holy of Holies in the tabernacle, and afterwards in the temple, cherubim wrought in embossed metal were represented above the mercy-seat, or covering the Ark of the Covenant, so that they appeared to rise out of it. Figures of cherubim were also wrought into the hangings of the Holy of Holies. The cherubim that appear in the visions of Ezekiel and the revelations of John depart much from the early representations. In Ezekiel they have the body of a man, whose head, besides a human countenance, has also that of a lion, an ox, and an eagle; they are provided with four wings, two

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of which support the chariot of Jehovah, and serve to fly, while the other two cover the body; the hands are under the wings, and the whole body is spangled with innumerable eyes. In the Revelation, four cherubim, covered with eyes, and having six wings, surround the throne of Jehovah; the first has the face of a lion, the second of an ox, the third of a man, and the fourth of an eagle. This gave rise at a very early period to the symbolical figures of the four evangelists, the human countenance being associated with Matthew, that of the lion with Mark, of the ox with Luke, and of the eagle with John. Most Jewish writers and Christian Fathers conceived the cherubim as angels; and Dionysius the Areopagite, in his "Celestial Hierarchy," makes them a separate class in the first hierarchy. Most theologians also considered them as angels, until Michaelis shewed them to be a poetical creation; and Herder, in his "Spirit of Hebrew Poetry," compared them to the griffins that watch treasures and other fabulous figures. In Christian art they are generally represented as sexless figures with wings from the shoulders, the legs also being either covered by wings, or having wings substituted for them. Very often they have also a glory round the head.

CHERUBINI, Luigi-Carlo-Zenobio-Salvatore-Maria, an eminent musical composer, was born at Florence in 1760 and received his early musical training there under the Felici (father and son), P. Bizzari, and C. Castrucci. He afterwards studied for a year at Bologna under Sarti, to whom he owed his thorough knowledge of counterpoint and fugue. He visited London in 1784, where he brought out two operas, "La Finta Principessa" and "Giulio Sabino," and afterwards settled in Paris for the remainder of his life, paying occasional visits to Italy. His "Ifigenia in Aulide" appeared in 1788; and in 1791 his "Lodoiska," which work first secured proper appreciation for his genius, and effected a change in the whole character of the French school of composition. These operas were followed in succession by "Elisa," "Medea," "Les Deux Journées" (also known as "Die Wasserträger") "Anacreon," and "L'Hôellerie Portugaise." His latest opera, "Ali Baba," was produced, after a long interval, in 1833. Besides operas, C. wrote numerous masses, motets, and other sacred compositions of so great merit, that Beethoven regarded him as the greatest living master of sacred music; also quartets for the violin, viola, and violencello, and symphonies. His latest work, "Cours de Contrepoint et du Fugue," appeared in 1835. C. died at Paris in 1842, and his "Requiem," the last of his masses, was performed at his funeral service.

CHERU'SCI, a German tribe first mentioned by Cæsar. They dwelt north of the Silva Bacencis, or Harz Forest, but the exact boundaries of their territory cannot be ascertained. They are chiefly memorable in connection with their great leader Arminius, or Hermann, who, having formed an alliance with other German tribes, attacked and annihilated the Roman legions under Varus, in the forest of Teutoburg, 9 A.D. After the death of Arminius, internal strifes broke out among the C., and Tacitus says that they were subjugated by the Chatti, a neighboring tribe. Notwithstanding this they again appear as the chief tribe in the military league of the Saxons about the end of the 3d century. In the beginning of the 4th c., they are included among the peoples who had leagued against Constantine, and towards the close of the same are still mentioned distinctively by Claudian.

CHE'RVIL (*Anthriscus Cerefolium*), an umbelliferous plant, which has been long cultivated as a pot-herb, and used in soups and for a garnish, &c., in the same manner as parsley. It is much more used in some parts of the continent of Europe than in Britain. It is a native of Europe, naturalised in some parts of England. The leaves have a peculiar, somewhat sweetish, pleasantly aromatic smell and taste, by which the plant may be known from its congener *Anthriscus vulgaris* or *Scandix Anthriscus*, a poisonous weed, whose leaves have a disagreeable smell, and which is also distinguished by its hispid fruit. There is a variety of C. with large roots, for the sake of which it is cultivated.—The umbelliferous plant called VENUS' COMB or SHEPHERD'S NEEDLE (*Scandix pecten* or *S. Pecten Veneris*), a native of Britain and of the continent of Europe, often found in cornfields, and remarkable for the appearance and large size of its fruit, and another species (*S. australis*) which grows in the south of Europe, have a taste and smell resembling C., and are used in the same way on the continent. SWEET C. or SWEET CICELY (*Myrrhis odorata; Scandix odorata* of the older botanists), a native of the south of

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Europe and of some parts of Asia, common in the neighborhood of houses in Britain, although probably not a true native, is frequently cultivated in Germany under the name of *Spanish C.* or *Anise Chervil.* In Scotland, the plant is commonly called *Myrrh* by the peasantry. Its smell is peculiarly attractive to bees; and the insides of empty hives are sometimes rubbed with its leaves, to induce swarms to enter.—The species of *Chærophyllum*, coarse weeds, are also called chervil.

CHE'SAPEAKE BAY, the largest inlet on the Atlantic coast of the United States, being 200 miles long and from 4 to 40 broad. Its entrance, 12 miles wide, has, on the north, Cape Charles, in lat. 37° 3′ n., and long. 76° 2′ w.; and on the south Cape Henry, in lat. 36° 56′ n., and long. 76° 4′ w., both promontories being in Virginia. C. B. has numerous arms which receive many navigable rivers, such as the Susquehanna and the Patapsco on the north, through Maryland; the James on the south-west, from Virginia; and the Potomac on the west, between these two states. Unlike the shallow sounds toward the south (see CAROLINA), this network of gulfs and estuaries, to say nothing of its noble feeders, affords depth of water for ships of any burden, virtually carrying the ocean up to the wharves of Baltimore and the arsenals of Washington.

CHE'SELDEN, William, an English surgeon and anatomist, was born in 1688 at Barrow-on-the Hill, in Leicestershire. He commenced his medical studies at fifteen, at twenty-three established himself as a lecturer on anatomy, and in the following year was elected a fellow of the Royal Society. He was afterwards appointed surgeon to St. Thomas's, St. George's, and Westminster hospitals, where he acquired great reputation as an operator. In this respect few surgeons if any ever surpassed him. He died at Bath, 11th April, 1752. C.'s principal works are—the "Anatomy of the Human Body" (1713), long a text-book on the subject in England; a "Treatise on the Operation for the Stone" (1723); and "Osteology, or Anatomy of the Bones" (1733). He also contributed several valuable papers to the Philosophical Transactions of the Royal Society.

CHE'SHIRE, a maritime county in the west of England, bounded north by the river Mersey, and partly also by the Irish Sea, in lat. 52° 56′—53° 54′ n., long. 1° 47′—3° 11′ w. Its greatest length from north-east to south-west is 58 miles; greatest breadth, 32; area, 1052 square miles, of which only $\frac{1}{16}$ is uncultivated; circuit 200 miles, of which 8 are coast. The surface forms an extensive nearly level plain between the Derbyshire and Welsh mountains, well wooded, and studded with small lakes or meres, and chiefly occupied by grazing and dairy tracts, which are among the most important in England. This plain, comprising four-fifths of the surface, rests on new red sandstone, and is crossed, near the middle, by a tract of high ground running south-west from a promontory overlooking the Mersey, near the mouth of the Weaver, to Beeston Castle rock, 366 feet high. On the east border of the county is a line of new red sandstone hills. In the north-east is part of the Lancashire coal-field. In the east, are large tracts of peat, and much of the county is wet and rushy. The north-west part of C. forms a hammer-headed peninsula called Wirral, about 8 miles broad, between the estuaries of the Dee and Mersey. Coal measures appear on the west side of this peninsula, as well as on the west border of the main part of the county. The chief rivers are the Dee, Mersey, and Weaver, which are navigable. The Dee skirts the county on the west 55 miles, and the Mersey on the north for 40 miles. The Weaver rises in the east part of the county, and runs 40 miles west-north-west into the Mersey. The county contains an almost unrivalled system of canals, including the celebrated Bridgewater Canal, and is traversed by the main line of the London and Liverpool Railway, and the Crewe, Chester, and Holyhead Railway. The chief mineral products are rock-salt and coal. The rock-salt, discovered in 1670, and mined by gunpowder, is found near the Weaver and its branches, especially near Northwich, at the depth of 28 to 48 yards, in two beds, the upper one being 15 to 25 yards, and the lower one above 40 yards thick, under a stratum of hard rock, 26 to 35 yards thick. The mines, one occupying 35 acres, when lighted up, resemble a fairy palace sparkling with gems and crystal. Much salt is also made from brine-springs 20 to 40 yards deep. Coal is worked in the north-east part of the county. There are also lead (with cobalt) and copper-mines, and in almost every part of the

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county freestone, limestone, millstone, and marl are found. The climate is moist. The soil is mostly a clayey or sandy loam, with marl and peat, and very fertile. The soil and climate are well fitted for pasturing, dairy-farming, and cheese-making, which are the chief agricultural occupations. About 160,000 cows are kept in C., and the quantity of cheese annually produced is estimated at from 15,000 to 30,000 tons—the best being made on the strongest lands. The hedgerows abound in oaks. C. is a manufacturing as well as an agricultural county. Pop. in 1871, 561,131. The chief towns are Chester (the county-town), Macclesfield, Stockport, Congleton, Knutsford, and Birkenhead. The county of C. returns 6 members to parliament. C. has some Roman roads, tumuli, barrows, remains of religious houses, and many old castles and halls. The 12th Roman legion occupied Chester till the 3d century. Egbert, in 828, added C. to the Anglo-Saxon kingdom of Mercia. William the Conqueror erected C. into a county palatine, under Hugh Lupus, with an independent parliament and 8 barons. Henry VIII. subordinated it to the English crown; but C. did not send representatives to the English parliament till 1549, and the separate jurisdiction ceased entirely only in 1831.

CHE'SNUT, or Chestnut (*Castanea*), a genus of plants of the natural order *Cupuliferæ*, closely allied to the Beech (*Fagus*), and distinguished from it by long male catkins, longitudinally set with groups of flowers, a 5—8-celled ovary, and compressed rounded nuts. The name is derived from the town of Castanum, near Magnesia, in Asia Minor. The COMMON C., SPANISH C., or SWEET C. (*C. Vulgaris*), is said to have been first brought from Asia Minor to Sardinia, and from thence to have gradually extended over the south of Europe, where it has long been naturalised, and forms extensive woods. It is an ornamental, stately, or, in exposed situations, a very spreading tree, of great size and longevity; the still surviving C. of Totworth in England was known as a boundary-mark in the reign of King John. A celebrated C. tree on Mount Etna measured 204 feet in circumference of trunk. The C. has oblongo-lanceolate, acuminate, serrated, smooth leaves. The timber is durable and hard, and is used in house-building, for making furniture, and for many other purposes. The timber of the C. so much resembles that of the oak, as in old buildings to be distinguished with difficulty. The bark is used for tanning, but is worth only about half the price of oak-bark. Young C. trees are much esteemed for hop and espalier poles. The C. is therefore frequently grown in England as coppice-wood; but it succeeds well as a timber-tree even in Scotland, although it does not generally ripen its fruit. In Devonshire, however, and in some other parts of England, it is planted to a considerable extent as a fruit-tree. It succeeds throughout all the middle latitudes of Germany, but dislikes a damp foggy atmosphere. It prefers a dry light soil, and succeeds only where there is a dry subsoil. The nuts are generally two in each husk. They form a principal part of the food of the poor in the south of Europe, being used either roasted or boiled, and often ground into flour, and made into a kind of bread. They contain 16 per cent of sugar, and by pressure yield a sugary juice, which readily undergoes the vinous fermentation, and from which a crumb-like kind of sugar may be obtained. The best kinds of chestnuts are called by the French *Marrons*. When cultivated as a fruit-tree, the C. is generally grafted, by which means the better varieties are secured.—Other species of C. also bear eatable fruits: those of the AMERICAN C. (*C. Americana*), a tree much resembling the common C., and of the DWARF C., or CHINQUAPIN (*C. pumila*), a low tree, or more generally a shrub of 7—8 feet high, are used in America. The fruit of the Dwarf C. is of the size of a common hazel-nut; the nut is convex on both sides. The plant reaches its southern limit on the banks of the Delaware.—A number of species are natives of the East. The inhabitants of the mountains of Java eat the fruit of the SILVERY C. (*C. argentea*), and the TUNGURRUT (*C. Tungurrut*), boiled or roasted, like the common chestnut. Both of these are large trees, the Tungurrut reaching a height of 150 feet.—The HORSE C. (q. v.) is entirely different from the true chestnut.

CHESS (Fr. *échecs*, Ger. *schach*). The origin of this, the most purely intellectual of all games of skill, has been much disputed; thus much may now be considered as certain, that, under the Sanscrit name of *Chaturanga*, a game, essentially the same as modern C., was played in Hindustan nearly 5000 years ago. In its gradual diffusion through the world in succeeding ages, the game has undergone many alter-

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ations and modifications, both in nature and in name; but marked traces of its early Asiatic origin and descent are still discerned by the learned in its nomenclature and other characteristics. From Hindustan, C. spread into Persia, and thence into Arabia. The Arabs, it would appear, in the 8th c., introduced the game into Spain and the rest of Western Europe; and in England, chess-play seems to have been known prior to the Norman Conquest. Into Constantinople, and probably some other cities of Eastern Europe, the game may have been imported from Persia at a period earlier than its Moorish conveyance into Spain.

The orginal Hindu game was played on a board of sixty-four squares, as now, but by *four persons*, two being allied against two, as in whist. Hence the name *Chaturanga*, from *chatur*, "four," and *anga*, "a member" or "component part." The name *Shatranj*, used by the Persians and Arabs, is a corruption of the Sanscrit. The English, French, and other European names are derived from the Persian term *shah*, "king." *Check*, the warning when the king is in danger, is but another form of *shah*; in fact, "king" is sometimes used for "check," and in German *schach* is both the name of the game and the term of warning. The term *rook* is from the Sans. *roka*, Pers. *rukh*, meaning a ship or chariot; *pawn* is said to be from *pean*, an attendant, or foot-soldier.

The books written upon C. "would form a tolerably large library." Of works on the antiquities of the subject, we may mention Dr D. Forbes's "History of Chess" (Lond. 1860). The best modern practical works on the art of chess-play are the "Chess-Player's Hand Book," "C. Praxis" and "Chess:" "Theory and Practice," by Staunton; Morphy's "Games at C.," edited by Lowenthal; Jaenisch's Treatise on the "Openings," translated by Walker; and Horwitz and Kling's "Collection of End-games." The subject is also pretty fully treated in Chambers's "Information for the People," "In-door Amusements."

The game of C. is played upon a square board marked out into sixty-four square divisions, which are colored alternately black and white, in order the more clearly to determine and denote the respective movements of the several pieces. In placing the board for play, each player must always have a *white* corner square at his right hand. There are two sets of pieces, of opposite colors, of sixteen men each, and of various powers according to their rank. These sets of men are arrayed opposite to each other, and attack, defend, and capture, like hostile armies.

The superior officers occupying the first row on each side are called *pieces;* the inferior men, all alike, standing on a row immediately in front of the pieces, are called *pawns*. Their moves and powers, along with the peculiar terms used in C., may be briefly described as follows:

A *Pawn*, at his *first* move, may advance either one or two squares, straightforward; but after having once moved, he can only advance a single square at a time. In capturing* an adverse piece, however, a pawn moves one square diagonally either right or left; but the pawn never moves backward. On arriving at an 8th square, or the extreme line of the board, a pawn may be exchanged for any piece his owner chooses to call for, except a king; so that a player may have several queens on the board at once. If, on moving two squares, a pawn pass by an adverse pawn, which has arrived at the 5th line, the advanced adverse pawn may take the other *in passing* in exactly the same manner as if the latter had moved but one square.

A Bishop moves any number of squares diagonally, but diagonally only; therefore a bishop can never change the color of his square.

A Knight moves two squares, so as always to change color—that is, he moves one square forward or backward, and one diagonally. On account of this crooked movement, he can leap over or between any surrounding pieces; and therefore a knight's check—unless he can be taken—always compels the king to move.

The Rook, or Castle, moves any number of squares forward, backward, or sidewise, but not diagonally.

The Queen is by far the most powerful of the pieces, and moves over any number of squares, either in straight lines or diagonals, forward, backward, or

* Taking is always performed by lifting the captured man from the board, and placing the captor on his square. The pawn is the only man whose mode of taking differs from his ordinary move.

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sidewise; so that her action is a union of that of the rook and bishop. At starting, the queen always stands on a square of her own color.

The King is the most important piece on the board, as the game depends upon his safety. He moves only one square at once, in any direction, except when he *castles*—a term to be explained presently. The king cannot be taken; but when any other piece attacks him, he is said to be in *check*, and must either move out of check or interpose some one of his subjects, unless the checking piece can be captured. When there is no means of rescuing the king from check, he is said to be checkmated, and the game is over. Of course, the two kings can never meet, as they would be in check to each other. *Double-check* is when a piece, by being moved, not only gives check itself, but also discovers a previously masked attack from another.

Castling is a privilege allowed to the king once in a game. The move is performed either with the king's rook or queen's rook—in the former case, the king is moved to the king's knight's square, and the king's rook is placed on the king's bishop's square: in the latter case, the king is played to the queen's bishop's square and the queen's rook is played to the queen's square. But the king cannot castle after having once moved, nor at a moment when he is actually in check, nor with a rook that has moved, nor when he passes over a square attacked or checked by an adverse piece, nor when any piece stands between him and the rook with which he would castle, nor when in the act of castling either the king or rook would have to capture an adverse piece.

A *drawn* game results from neither player being able to checkmate the other: thus, a king left alone on each side must of course produce a draw, as do also a king with a bishop, or a knight, against a king.

Stalemate, or the not being able to move either the king or any other piece, also constitutes a drawn game.

Odds is a term applied to the advantage which a stronger player should give to a weaker; thus, the removal of a rook or knight from the better player's forces may be fair odds; or if the players are more nearly matched, the one may give a pawn. When the odds of a pawn are given, it is always understood to be the king's bishop's pawn.

Gambit is a technical word implying the sacrifice of a pawn early in the game, for the purpose of taking up an attacking position with the pieces.

Supposing the worth of a pawn to be represented by unity, the following is a tolerable average estimate of the comparative value of the pieces: Pawn 1, bishop 3, knight 3, king 4, rook 5, queen 9.

The chess-men being placed, the players begin the engagement by moving alternately; each aiming to gain a numerical superiority by capturing his opponent's men, as well as such advantages of position as may conduce to victory.

The rows of squares running straight up and down the board are called *files*, those running from side to side are called *lines*, and those running obliquely across are termed *diagonals*.

The playing over the following short game will serve him as a little initiatory practice.

WHITE.	BLACK.
1. King's Pawn two.	1. King's Pawn two.
2. King's Bishop to Queen's Bishop's 4th.	2. King's Bishop to Q Bp's 4th.
3. Queen to King's Rook's 5th.	3. King's Knight to K Bp's 3d.
4. Queen takes King's Bishop's Pawn, giving Black checkmate.	

The foregoing brief mode of giving a checkmate is called the *Scholar's mate*, and is often practiced upon young and unwary players.

In the conduct of the game, and in the practice of C., the following rules, precepts, and hints will be found very generally useful:

Play forth your minor pieces early, and castle your king in good time. You may sometimes delay castling with advantage, but not often.

Do not expect to be able to establish an enduring attack with half your forces at home.

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Seek to let your style of play be attacking; and remember the gaining or losing of time in your measures is the element of winning or losing the game.

Never touch a piece without moving it, nor suffer yourself or your opponent to infringe any other of the laws of the game.

You will find, when first player, that the opening springing from your playing 1st King's pawn two, and then your King's Knight to the Bishop's 3d, is one of the best that you can adopt; but do not adhere to any one opening only.

If you wish to adopt a purely defensive opening, you may play 1st King's pawn one and follow up with Q P 2, and Q B P 2.

Next to playing with good players, nothing will conduce to improvement more than looking on at two expert players whilst they play. Wanting these advantages, it is best to play over openings, and actual games, from books or journals.

To prevent blunders and oversights, always endeavor to perceive the motive of your adversary's move before you play; and look often round the board to see that you are not losing sight of any better move than the one you intended, or that you are not suffering yourself to be tempted by a bait.

When an onlooker, never interfere.

Always endeavor to lose with good temper, and to bear your adversary's faults with a good grace.

The Laws of Chess.

The laws of C. are at present in a somewhat unsettled, unsatisfactory condition; but the following are the principal prevailing regulations of the game:

1. If any error have been committed in the placing of the board or men, either player may claim that the game shall be finished as it stands, after four moves have been completed on each side, but not else.

2. A move once made, by your having moved a piece and left hold of it, cannot be retracted.

3. If you touch a piece, you must play that piece; but as long as you retain your hold, you can play it where you like. If you touch a piece that cannot move, your opponent may compel you to play your king, unless the king be unable to move. When you touch your pieces for the mere purpose of adjusting them, you are bound to say so.

4. If you make a false move, your opponent may either cause you to retract it and move your king, or he may claim that the false move shall stand, or that you shall make a legal move with the same piece, at his pleasure.

5. If you touch one of your opponent's men, he may compel you to take that man; or if that be impossible, to move your king, provided he can move without going into check.

6. If on the king being checked, due notice is not given, the player whose king is attacked is not bound to notice it.

7. In every fresh game, except when one is drawn, the first move alternates.

8. Drawn games counting as no games at all, the player who had the first move in a drawn game is also entitled to it in the next. (This absurd regulation is fast becoming obsolete; and it is now a common agreement in playing a series of games, that the move shall invariably alternate.)

9. A player who gives the odds of a piece, is entitled to the first move.

10. The time for consideration of a move is not limited; but a player leaving a game unfinished without his opponent's permission, loses such game.

11. When at the end of a game one player is left with just sufficient superiority of force to win—such as a king and rook against king, king and two bishops, or king, knight, and bishop against king—he who has the greater force must give checkmate within fifty moves on each side, or else the game is adjudged to be drawn. This law is framed to prevent unskilful players from wearying their opponents by persisting in the attempt to accomplish what they are too untutored to effect; and it is perfectly just, since the allotted number of moves is amply large enough and to spare.

12. In case of any dispute about the laws, both players are to agree as to an umpire, whose decision is to be considered final.

As there is no branch of chess study better calculated to advance the skill of a

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learner than the attentively playing over recorded games between first-rate players, we have given an example of a game played blindfold, simultaneously with five other games, by the celebrated American chess-player, Paul Morphy. This gentleman visited England and the continent of Europe in 1858, and in his contests with the best players fairly carried all before him, so that he soon ranked as the greatest chess-player living.

White—Mr Morphy.	Black—Mr C——.
1. P to K 4.	1. P to K 4.
2. K Kt to B 3.	2. Q Kt to B 3.
3. K B to Q B 4.	3. K B to Q B 4.
4. P to Q Kt 4.	4. B takes Kt P.
5. P to Q B 3.	5. B to Q R 4.
6. P to Q 4.	6. P takes P.
7. Castles.	7. P takes P.
8. Q B to R 3.	8. P to Q 3.
9. Q to Q Kt 3.	9. K Kt to R 3.
10. Q Kt takes P.	10. K B takes Kt.
11. Q takes B.	11. Castles.
12. Q R to Q.	12. Kt to K Kt 5.
13. P to K R 3.	13. K Kt to K 4.
14. Kt takes Kt.	14. Kt takes Kt.
15. B to K 2.	15. P to K B 4.
16. P to K B 4.	16. Kt to Q B 3.
17. K B to B 4, ch.	17. K to R.
18. Q B to Kt 2.	18. Q to K 2.
19. Q R to K.	19. R to B 3.
20. P takes P.	20. Q to K B squ.
21. R to K 8.	21. Q takes R.
22. Q takes R.	22. Q to K 2.
23. Q takes Kt P, ch.	23. Q takes Q.
24. P to K B 6.	24. Q takes Kt P, ch.
25. K takes Q.	25. B takes P, ch.
26. K takes B.	26. P to K R 4.
27. R to K Kt, and wins.	

CHEST, Military, is a technical name for the money and negotiable securities carried with an army, and intended to defray the current expenses. In the English military system, this department is managed by the commissariat.

CHEST, Naval. The name of C. has been given to certain funds, maintained for the benefit of seamen belonging to the royal navy. A fund, called the *Chest at Chatham*, was suggested so long ago as the days of Drake and Hawkins, for the relief of wounded and superannuated seamen. In 1590, all seafaring men in Queen Elizabeth's service consented to a stoppage out of their pay of 2*d.* to 6*d.* per month, to support this fund. The money was not in those days, as it would be now, put out to interest; it was kept in a C., and hence the name given to the fund itself. During the 18th c., the system became organised in a better manner; but still the fund retained the name of C.; insomuch that when the office was removed from Chatham to Greenwich, in 1806, it became the *Chest at Greenwich*. The C. is managed *ex officio*, and accounts are annually laid before parliament. Handsome gifts are occasionally made to the fund by individuals. Disabled sailors receive a present sum of money, if not deprived of the power of earning a living; but if their injuries are more permanent, they receive a pension from the C., for one year, or for several years, or for life, paid half-yearly.

CHEST, or Tho'rax, in Anatomy, is the part of the body which lies beneath the neck and above the Abdomen (q. v.), constituting the uppermost of the two divisions of the trunk, or that which contains the heart and lungs, and is bounded externally by the ribs. The C. is somewhat conical in form, the broad or lower end of the cone being shut in by the diaphragm, a large muscular partition which projects upwards from the lower ribs, being convex towards the C., and concave

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towards the abdomen. In Respiration (q. v.), the diaphragm descends by its own muscular contraction, while at the same time the ribs are drawn upwards and outwards by the intercostal muscles. The cavity of the C. is thus enlarged, the lungs are expanded, and air is drawn into them through the trachea or windpipe and bronchi. See LUNGS. The combination of bone, cartilage, muscle, and tendon entering into the composition of the C. is such as to permit of expansion-movement to the extent required, and yet to guard against over-expansion, which would be fatal to the delicate textures within. The bones of the C. are at the same time a powerful protection against external injury.

The structures forming the walls of the C. are: 1. The backbone or spinal column, divided into 24 vertebræ, 12 of which, called the dorsal vertebræ, form the thoracic portion. 2. Twelve ribs, attached to the transverse processes or projecting portions of the dorsal vertebræ, and ending in front in the costal cartilages, by which the ribs are connected with, 3. The sternum or breastbone, C, which occupies the middle line. 4. The Diaphragm (q. v). See also SKELETON.

The contents of the C. are the heart, the great arteries and veins, the lungs, the trachea or wind-pipe, the bronchi or branches of the trachea, leading to the lungs, the œsophagus or gullet, and the Thoracic Duct (q. v.), or general terminus of the lymphatic system of vessels, by which the chyle and lymph are discharged into the blood. The very great importance of these parts to life, and their great liability to deranged action, renders the C. the seat of a large proportion of the diseases which afflict humanity, and especially of those which end in death. Indeed, of the three organs which the great physiologist, Bichat, called the "tripod of life"—viz., the brain, heart, and lungs—the C. contains two; hence its condition in almost all diseases, and especially in fatal diseases, is an object of the utmost solicitude to the physician.

The diseases of the C. depend in some cases on alterations in its form, as by Rickets (q. v.) and other diseases affecting the bones in early childhood or in youth, as by too tight lacing in girls. The lungs and air-tubes are subject to a great variety of diseases, among which the principal are consumption or phthisis pulmonalis, pneumonia, pleurisy, bronchitis or pulmonary catarrh. The heart is subject to pericarditis, endocarditis, and chronic organic diseases of the valves, as well as to enlargement (hypertrophy), dilatation, and degenerations of its muscular texture. The aorta, or great artery, is often affected with degeneration of its walls, and occasionally with aneurism. The great veins are liable to over-distension, and to obstruction by tumors or by congulation of the contained blood. The Thoracic duct is also sometimes obstructed by external pressure; and the œsophagus has a number of diseases usually described in connection with the alimentary canal. Most of the diseases here referred to are described either under special articles, or under LUNGS and HEART.

The examination of the C. by physicians is now conducted not only by an investigation of the symptoms or obvious characters of the disease, but by a minute and elaborate examination into the physical condition of the contained organs by means of Auscultation (q. v.), Percussion (q. v.), Measurement, &c. The application of these methods is too complicated and technical for explanation in detail, but their results will be shortly alluded to incidentally in the articles above referred to on the diseases of the chest. The name of Laennec (q v.) will be long remembered in medicine as that of a great original observer, who has contributed more than any other to the progress of knowledge in this department.

CHE'STER, an ancient and episcopal city, municipal and parliamentary borough, and river port, the capital of Cheshire, on the right bank of the Dee, 22 miles from the mouth of its estuary, 16 miles south-east of Liverpool. It stands on a rocky sandstone height, and is mostly enclosed in an oblong quadrangle of ancient walls, 7 or 8 feet thick, nearly 2 miles in circuit, and with 4 gates, and now forming a promenade with parapets, where two persons can walk abreast. The two main streets cross each other at right angles, and were cut out of the rock by the Romans 6 to 10 feet below the level of the houses. The houses in these streets are curiously arranged: the front parts of their second stories, as far back as 16 feet, form a continuous paved promenade or covered gallery, open in front where there are pillars and steps up from the street below, with private houses above, inferior shops and warehouses below, and the chief shops of the town within. This

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arrangement, called the "rows," together with the ancient walls and the half-timbered construction of many of the houses, with quaintly carved ornamented gables of the 16 c., render C. perhaps the most picturesque city in England. C. cathedral is an irregular massive structure of crumbling sandstone, 375 by 200 feet, with a tower of 127 feet. It was formerly the church of the abbey of St Werburgh, and for 650 years was one of the richest in England. St John's Church, now partially in ruins, is supposed to have been founded by Ethelred in 698. The Dee is crossed by a superb stone arch of 200 feet span. Suburbs of villas have recently arisen outside the walls; and a public park, presented by the Marquis of Westminster, was opened in 1867. The C. railway station is the centre of several important railways, and is one of the largest and finest in the kingdom. C. has manufactures of lead, iron-foundries, chemical works, and an iron-ship building yard. The chief exports are cheese, copper, cast-iron, and coal. C. has many charitable and religious institutions, and is the abode of many wealthy families. Pop. (1871) 35,257. The city is a county in itself, and returns two members to parliament. In 1875, 3550 vessels, of 218,368 tons, entered and cleared, but the silting up of the mouth of the Dee is against the shipping trade.

C. was *Devana Castra*, or Colonia Devana, an important Roman station, and has yielded many Roman remains—as masonry, coins, inscriptions, fibulæ, altars, a hypocaust, and a statue of Pallas. C. was only in 828 taken by the Saxons from the Britons. Its strength made it a refuge against the descents of the Danes and Northmen, but the Danes took it in 894. Ethelfrida retook it in 904, and rebuilt the walls. From the Norman Conquest to the time of Henry III., the Earls of Chester had their own courts and parliaments at C., with 8 subfeudatories and the superiors of the great religious houses, Cheshire being then a county palatine. Henry III. made his eldest son Earl of Chester, a title held since by the Prince of Wales. Llewelyn ravaged C. in 1265. The 25 famous C. mysteries or religious plays by Randle, a monk (1250—1260), were acted in the church. After a long siege, the parliamentary forces defeated those of Charles I. at C., and took the city. Pearson and Porteus were bishops of Chester. Trinity Church contains the remains of Matthew Henry, the biblical commentator. The commerce of C. has steadily declined since the rise of Liverpool.

CHE'STERFIELD, a municipal borough in Derbyshire, near the Hipper and Rother rivulets, 24 miles north-north-east of Derby by rail. There are manufactures of leather, silk, lace, earthenware, and machinery; and there are several blasting furnaces in the neighborhood. The manufactures are increasing rapidly, and the minerals in the neighborhood, including coal, iron, potters' and brick clay, slates and lead, are being greatly developed. The population was in 1851, 7100; in 1871, 11,427. Trade is facilitated by a canal connecting C. with the Trent, and by the main line of the Midland Railway.

CHESTERFIELD, Earl of (Philip Dormer Stanhope), an English statesman and author, eldest son of the third Earl of Chesterfield, was born in London September 22, 1694, and studied at Cambridge. In 1714 he made the tour of Europe, and the following year was appointed a gentleman of the bedchamber to the Prince of Wales. About the same time he was elected M.P. for St Germains in Cornwall. In 1726, on his father's death, he became Earl of C., and in 1727 was sworn a privy councillor. In 1728 he was appointed ambassador extraordinary to Holland, and in 1730 was made a knight of the Garter and Lord Steward of the Household, but soon resigned that office. An eloquent and frequent speaker, he took an active part in all the important business in the House of Lords, and was for several years the strenuous opponent of Sir Robert Walpole, then premier. In 1744, he connected himself with the administration, and in 1745 was re-appointed ambassador to the Hague, but was soon nominated Lord-lieutenant of Ireland, where he rendered himself exceedingly popular. In October 1746, he became one of the principal secretaries of state, but, two years after, declining health caused him to resign office, and in 1752 he was seized with deafness. Distinguished by brilliancy of wit, polished grace of manners, and elegance of conversation, he lived in intimacy with Pope, Swift, Bolingbroke, and other eminent men of the day. Dr Johnson, whose Dictionary, on its appearance, he affected to recommend, called him "a wit among lords, and a lord among wits." He wrote several papers, on temporary

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subjects, in "The Craftsman," "The World," periodicals of the times; but he is now best known by his "Letters to his Son," Philip Dormer, written for the improvement of his manners. These letters have often been republished, and they afford a good idea of the mental and moral calibre of the author. Lord C. died March 24, 1773.

CHESTERFIELD INLET, a long and narrow gulf, penetrating to the westward from the north-west of Hudson's Bay. Its extreme dimensions are 250 and 25 miles; and the lat. and long. of its mouth are 63° 30′ n., and 90° 40′ w. C. I. is studied nearly throughout with islands.

CHEVALIE'R (Fr. *cheval*, a horse), in Heraldry, a horseman armed at all points. In its more general acceptation it signifies a Knight (q. v.). See also BANNERET and CHIVALRY.

CHEVALIER, Michel, an eminent French economist, born at Limoges, January 13, 1806, was, at the age of 18, admitted a pupil of the Polytechnic School. Thence he went to the School of Mines, and some days before the revolution of July, he was attached as an engineer to the department du Nord. Led away by the theories of the St Simonians, he was for two years editor of the "Globe," the organ of that sect. Joining the schism of M. Enfantin, he took an active part in the compilation of the "Livre Nouveau," the standard of their doctrines, and in 1832 suffered six months' imprisonment, on account of his free speculations in regard to religious and social questions, being regarded as an outrage on public morals. On his liberation, he at once retracted all that he had written in the "Globe" contrary to Christianity, and against marriage, and obtained from M. Thiers a special mission to the United States, to inquire into the systems of water and railway communication there. The results were published in his "Letters from North America" (1836, 2 vols. 8vo). After a visit to England, he issued a work entitled "Material interests in France: Public Works, Roads, Canals, Railways" (1838, 8vo). He was named, successively, Chevalier of the Legion of Honor, Councillor of State (1838), a member of the Superior Council of Commerce, and of the Royal Council of the University; and, in 1840, Professor of Political Economy in the College of France. In 1840, he was re-established in the Corps of Mines as engineer of the first-class; and in 1845, elected a member of the Chamber of Deputies. Under the Republic, he lost his various employments. He published, in 1848, "Letters on the Organisation of Labor and the Question of the Laborers;" and after the *coup d'état* of December 2, was restored to his professorship, and named councillor of state. In 1860, C. assisted Mr Cobden in carrying into effect the commercial treaty between France and England, and was created a senator. He became a Grand Officer of the Legion of Honor, 1861. Besides the works mentioned, he has written "Political Economy" (1842—1850); "Probable Fall of the Value of Gold" (1859—translated by Cobden); "Mexico, Ancient and Modern" (1863); &c.

CHEVAUX-DE-FRISE, in Fortification, is a hastily constructed substitute for a regular abattis, to stay the progress of an advancing enemy. It may be constructed in any way of wood or iron, provided it presents an array of sharp or ragged points towards the enemy. Sometimes it is made of barrels or centres of timber, with spears springing out from all sides, in such a way as to constitute both a support and a defence. Among the *matériel* of an army under the care of the engineers, are sometimes comprised C. formed of cylindrical iron barrels, about 6 feet long, each having 12 holes to receive as many spears; the spears can be packed away in the barrel, when not in use. Each such piece constitutes a *cheval;* and many such, ranged end to end, form *chevaux*, to be used in ditches around a fortification, on the berme beneath the parapet, behind the glacis, across a breach in the rampart, on in any spot where a check to the storming party is needed. At Badajoz, during the Peninsular war, great service was rendered by a C. formed of sword-blades fixed into beams of wood. The name is said to have been derived from "Friesland horse," and to have been first applied by the French during the wars of the 17th century.

CHE'VIOT HILLS, a mountain-range occupying contiguous parts of the counties of Northumberland and Roxburgh, on the English and Scotch borders, and running 35 miles from near the junction of the Till and Tweed, in the north-east, to the

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sources of the Liddel, in the south-west. The highest points are C. Hill, 2684 feet, and Carter Fell, 2020. West of Carter Fell, these hills chiefly consist of carboniferous sandstone and limestone, with protrusions of trap. The east portion of the range is porphyritic, and includes higher and more or less conical hills. In the C. H. are the sources of the Liddel, Tyne, Coquet, and some of the branches of the Tweed. Grouse abound, and the golden eagle is seen. These hills afford pasture for the Cheviots, a superior breed of sheep. They have been the scene of many bloody contests between the English and Scotch.

CHEVRE'TTE. See GYN.

CHEVREUL, Michel Eugène, a distinguished French chemist, born August 31, 1786, at Angers, in the department of Maine-et-Loire. In 1820, he was made an examiner in the Polytechnic School; and in 1824, director of the dyeing department in the manufactory of the Gobelins. This last position led him to institute a series of accurate researches on colors, the results of which he made known in a series of "Mémoires" of the Academy of Sciences. Previous to this, C. had made himself known in the scientific world by a variety of researches and writings. In 1826, he was made a member of the Academy; and in 1830, Professor of Applied Chemistry in the Museum of Natural History. Besides a great number of articles in the "Journal des Savants," beginning with 1820, the following works of C. deserve mention: "Leçons de Chimie appliquée à la Teinture" (1828—1831); "De la Loi du Contraste simultané des Couleurs et de l'Assortiment des Objets coloriés" (1839); "Théorie des Effets Optiques que présentent es Etoffes de Soie" (1846); "De la Baguette divinatoire, du Pendule, et des Tables tournantes" (1854); "Des Couleurs et de leur Application aux Arts Industriels" (1864); and a work on a new organic acid, "L'Acide Aviqne" (1871). C. is a Fellow of the Royal Society of London, and a Commander of the Legion of Honor.

CHE'VRON, in Heraldry, an ordinary representing the couples or rafters of a house, and supposed to betoken the accomplishment of some memorable work, or the completion of some business of importance, generally the foundation of his own family by the bearer. The C. is formed of two lines placed pyramidically, i. e., joined together at the top, and descending to the extremities of the shield in the form of a pair of compasses. *Chevronel*, a diminutive—half the size—of the chevron. *Per chevron*, or *party per chevron*, is where the shield is divided by a line in the form of the chevron.

CHEVRON, in Architecture, a moulding in the form of a succession of chevrons, otherwise called a zigzag moulding. In general, it is characteristic of Norman architecture, but is also found with the pointed arch, during the transition period from Norman to Early English.

CHEVRONS are braids or bands of lace, worn as distinguishing marks by the non-commissioned officers of regiments. The corporals, and the various grades of sergeant, have C. varying from one to four in number, either of white or gold lace. In most corps, they are worn on the right arm only; but in the Guards, the Fusiliers, the Light Infantry, and the Grenadier and Light Infantry companies of the ordinary regiments, on both arms.

CHEVY CHASE, the name of perhaps the most famous of British ballads. In its present form, the piece does not seem to be older than about the beginning of the 17th century. But more ancient versions, doubtless, existed; and Bishop Percy has published a poem of the 16th c., which has obviously suggested passages in the more recent composition. It is impossible to reconcile its incidents with history, but the event which is meant to be commemorated appears to have been the battle of Otterburn, in August 1388—a fight which Froissart declares to have been the bravest and more chivalrous which was fought in his day. According to the ballad, Percy vowed that he would enter Scotland, and take his pleasure for three days in the woods of his rival, and slay the deer therein at will. Douglas, when he heard the vaunt, exclaimed: "Tell him he will find one day more than enough." Accordingly, at the time of the hay-harvest, Percy, with stag-hounds and archers, passed into the domains of his foe, and slew a "hundred fallow-deer and harts of grice." When the English had hastily cooked their game, and were about to retire, Earl Douglas, clad in armor, and heading his Scottish spears, came on the scene. Haughty challenge

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and defiance passed between the potentates, and the battle joined. In the centre of the fray the two leaders met: "Yield thee, Percy!" cried Douglas. "I will yield to no Scot that ever was born of woman!" cried Percy. During this colloquy, an English arrow struck Douglas to the heart. "Fight on my merry men!" cried he, as he died. Percy, with all the chivalrous feeling of his race, took the dead man by the hand, and vowed that he would have given all his lands to save him, for a braver knight never fell by such a chance. Sir Hugh Montgomery, having seen the fall of Douglas, slapped spurs to his horse, dashed on Percy, and struck his spear through his body a long cloth-yard and more. Although the leaders on both sides had fallen, the battle, which had begun at break of day, continued till the ringing of the curfew-bell. Scotsmen and Englishmen claim the victory. When the battle ended, representatives of every noble family on either side of the border lay on the bloody greensward.

CHEYNE, George, an eminent Scottish physician, born in Aberdeenshire in 1671, was at first intended for the church, but preferring the medical profession, studied at Edinburgh, under the celebrated Dr. Pitcairn. In 1700, after taking the degree of M.D., he repaired to London, where he practised in winter, and in Bath in summer. From full living he became enormously fat, as well as asthmatic, and resolved on strictly adhering to a milk and vegetable diet, from which he derived so much benefit that he recommended it in all his principal medical treatises. In 1702, he published "A New Theory of Fevers," and, in 1703, a work "On Fluxions," which procured him admission into the Royal Society. Among his other works are: "Philosophical Principles of Natural Religion," 1705; "Observations on Gout," 1722; "Essay on Health and Long Life," 1725; "The English Malady, a Treatise on Nervous Disorders," 1733; "Essay on Regimen," 1739; "Account of Himself and of his various Cures," 1743. Dr C. died at Bath, April 12, 1743.

CHIABRERA, Gabriello, an Italian poet, born at Savona, 8th June 1552. He was educated at Rome under the care of his uncle, after whose death he entered the service of Cardinal Cornaro, but was obliged to leave it in consequence of the revenge he had taken on an Italian nobleman who had done him an injury. In his 50th year he married, and remained independent for the rest of his life. He died 14th October 1637. C.'s poetical faculty developed itself late. Having commenced to read the Greek writers at home, he conceived a great admiration of Pindar, and strove successfully to imitate him. He was not less happy in catching the naïve and pleasant spirit of Anacreon; his canzonetti being distinguished for their ease and elegance, while his "Lettere Famigliari" was the first attempt to introduce the poetical epistle into Italian literature. C. also wrote several epics, bucolics, and dramatic poems. His "Opere" appeared at Venice, in 6 vols., 1768.

CHIA'NA (in ancient times *Clanis*), a river in Tuscany formed by several streams from the Apennines, and falling into the Arno a few miles below Arezzo. Along with another river of the same name, which, flowing in the opposite direction, enters the Paglia at Orvieto, it waters the perfectly level Val di Chiana, which its overflow rendered once the most pestilential district of Italy. Ferdinand III. and his minister, Fossombroni, undertook extensive hydraulic works for improving the bed of the river, which they led through the lakes of Montepulciano and Chiusi, and employed for the artificial irrigation of the whole valley. The district has since become the most fruitful, perhaps, of all Italy—a perfect garden, supporting a population of more than 100,000.

CHIA'PA, or CHIAPAS, a state in the south-east of the Mexican confederation, lying to the southwest of Yucatan and extending in lat. between 16° and 18° n., and in long. between 90° 30' and 94° w. It contains about 19,000 square miles and 194,000 inhabitants, chiefly aborigines. Near Palenque, one of the towns of C., are some of the most extensive and magnificent ruins in Central America.

CHIARAMO'NTÉ, a town of Sicily about 32 miles west-south-west of Syracuse. It is situated on a hill, and has well built, regular streets. Wine of good quality is produced in the district. Pop. about 9000.

CHIA'RI, a town of Lombardy 14 miles west of Brescia, on the railway between that place and Milan. It is an ancient place, many Roman remains being still found

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here; and at one time it was strongly fortified, but its walls are now ruinous. Silk is the staple manufacture. Pop. 10,000.

CHIAR-OSCU'RO (Ital.), an artistic term, composed of two Italian words, the one of which signifies light, the other darkness or shadow. But C. signifies neither light nor shadow; neither is it adequately described by saying that it is the art of disposing of both lights and shadows in a picture, so long as either is regarded apart from the other. It is rather *the art of representing light in shadow and shadow in light*, so that the parts represented in shadow shall still have the clearness and warmth of those in light, and those in light the depth and softness of those in shadow. It is not the making of the one die softly and gradually away into the other, but the preservation of both in combination, as we constantly see it in nature, when the light is not the mere glare of the sun striking on a particular object, nor the shadow the entire absence of the influence of light. That the skilful treatment of C. is a matter of extreme difficulty, is plain enough from the very small number of artists who ever attain to it. Still, it is a branch of art without the mastery of which no painting can be successful in any department. It is as indispensable in portrait-painting as in the highest departments of ideal art; and though a just and even a lofty conception of the subject may be distinctly indicated by attention to form alone, it is impossible that its realisation can ever be satisfactorily accomplished by any one who has not mastered this most subtle mode of handling colors. The only mode by which a knowledge of C. can be attained, so as to apply it to practice, is by studying it as exhibited by such painters as Titian, Rubens, Rembrant, and, above all, Correggio.

CHIAVA'RI, a maritime town of Piedmont, situated on the Gulf of Rapallo, at the mouth of the Sturla, 21 miles east-south-east of Genoa. The houses in general are well built, with open arcades skirting the narrow streets. C. had several fine churches, the principal of which is the *Madonna del' Orto*. Numerous picturesque old towers, one of them of considerable size, are scattered over the town. Lace and silk are manufactured here; and the place is also noted for its light, handsome, cheap furniture, made chiefly of cherry-wood. The anchovy fishery is important; and in the vicinity are extensive slate-quarries. Pop. 10,457.—The old province of C., of which the above town was the capital, had an area of 155 square miles, with a population of 109,000. Its surface is generally mountainous, but it has valleys of great fertility, yielding grain, grapes, olives, &c. Cattle, sheep, goats, and silk worms are raised.

CHIAVE'NNA, a town of Lombardy, beautifully situated in the midst of vineyards, at the junction of the valley of St Giacomo and Val Bregaglia, 38 miles north-north-west of Bergamo. It is overlooked by the Rhetian Alps; and its position on the Splügen road secures it considerable traffic. Silk, cotton, and a coarse ware cut out of a soft stone found in the neighborhood, are the chief manufactures. Pop. about 4000.

CHICA, a red feculent substance, valuable as a dye-stuff, giving an orange-red color to cotton. It is obtained by boiling the leaves of a species of *Bignonia* (*B. Chigá*), a native of the banks of the Cassiquiare and the Orinoco. The Indians use it for painting their bodies. The C. plant is a climber, with abruptly bipinnate leaves, smooth heart-shaped leaflets, and flowers in pendulous axillary panicles. See BIGNONIACEÆ.

CHICA, Pito, Poso, or Maize Beer is a fermented liquor made from maize or Indian corn. It is much used in some parts of South America, and is made in a similar manner to ordinary beer; but the Indians sometimes prepare it by chewing instead of crushing the grains; and that which is so prepared (*Chicha mascada*, or chewed C.) is most highly esteemed by them. When they wish to make this liquor particularly strong and well flavored, they have also a practice of pouring it into an earthen jar, which contains some pounds of beef; and having made the jar perfectly air-tight, they bury it several feet deep in the ground, where it is left for several years. On the birth of a child, it is their custom thus to bury a jar of C., to be drunk at the same child's marriage. C. has an agreeable flavor, and is very strong and intoxicating. A spirituous liquor is obtained from it by distillation; vinegar is also made from it.

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CHICACO'LE, a town of the district of Ganjam, in the presidency of Madras, being in lat. 18° 18′ n., and long. 83° 58′ e., and lying 415 miles to the south-west of Calcutta, and 435 to the north-east of Madras. It stands on the left or north bank of the Naglaudee, not far from the Bay of Bengal. It is a military station, and contains, besides its garrison, (1871) 15,587 native inhabitants. The place has a reputation for its richly worked muslins.

CHICA'GO (pronounced *She-kaw-go*), the principal city of Illinois, and seat of Cook county, is situated on the south-western shore of Lake Michigan, at the mouth of the Chicago River, lat. 41° 50′ 20″ n., long. 87° 37′ w. The name is of Indian origin, signifying "wild onion," and is first mentioned by Perrot, a Frenchman, by whom it was visited in 1671. In 1803, a stockade fort was erected near the mouth of the river, and named Fort Dearborn. When the war with Great Britain broke out in 1812, the government, apprehensive that a post among the Indians so far from the frontiers could not be successfully maintained, ordered the commander to abandon it. The Indians destroyed the fort, which was rebuilt in 1816. C. was first settled in 1831, previous to which time it was a mere frontier-post; in 1832, it contained about a dozen families, besides the officers and soldiers in Fort Dearborn. The town was organised by the election of a Board of Trustees, August 10, 1833. In September 26 of the same year, a treaty was made for all their lands with the Pottawatomies, 7000 of the tribe being present, after which they were removed west of the Mississippi River. The first charter of the city was passed by the legislature March 4, 1837. The following table exhibits the rapid increase of Chicago. The estimated number of the population in 1835 was 1000, and the exact number, according to the census returns, was, in

1840	4,470	1855	83,509
1845	12,080	1860	150,000
1848	20,035	1865	187,446
1850	28,260	1870	298,977
1852	38,733	1875	410,000
1853	60,652	1880	503,185

C., perhaps the most remarkable city in the world for its rapid growth, is built upon a plain sufficiently elevated to prevent inundation. Some years ago, the elevation of the principal streets, also the buildings, were raised from 4 to 10 feet, the object of this gigantic undertaking being to admit of a thorough system of sewerage. The Chicago River and its branches separate the city into three divisions, connected by large tunnels. The main stream, flowing directly west, is about 100 yards wide, and forms one of the best harbors on the lakes. Vessels ascend the river and its branches a distance of 4 miles from its mouth, thus affording nearly 18 miles of wharfage. The water for the city is now supplied by a tunnel from Lake Michigan, which was opened in 1867, and supplies 57,000,000 gallons daily. There are also about 40 artesian wells. C. possesses a splendid system of public parks, and numerous handsome buildings. More than 30 railways meet here.

The Illinois and Michigan Canal, completed in 1848, connects the Chicago and Illinois Rivers, thus affording communication between the lakes and Mississippi to the coal-fields of Illinois, and to the vast quarries of so-called Athens marble, regarded as the finest building-material in the country. It is found on the banks of the canal, about 20 miles from C.; and is easily worked when first quarried, like the Caen stone.

The 86 public schools of C.—some capable of holding 1000 children—afford the means of education, free of charge, to every child in the city. At the head of the system is the High School. Here the sons and daughters of the poorest man may aspire to the highest honors in the classics and modern languages. There are also numerous private schools and seminaries, besides several universities, medical colleges, theological, literary, and scientific institutions located in Chicago.

Since 1858 pork-packing has been conducted on an enormous scale. In 1872, cattle to the value of $41,000,000 were received, and 16,080 head were packed as beef. The value of hogs received was $33,500,000, and 1,456,650 were packed as pork. Since 1854, C. has been the largest primary grain-dépôt in the world. In 1872, 88,426,842 bushels of bread-stuffs were received, and 83,364,224 shipped. C. is also the most extensive lumber market in the world. There are 80 newspapers and periodicals.

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In October 1871, a terrible fire occurred, which burned 18,000 houses, extending over more than 2000 acres; 200 persons perished, and nearly 100,000 were rendered homeless. The property burned was estimated at 200,000,000 dollars. This stupendous calamity awakened the practical sympathy of the civilized world. Great Britain and other countries subscribed money freely for the sufferers. The city was entirely rebuilt in a style of great magnificence within two years.

CHICHE'N, a town of Central America, in the north-east of the peninsula of Yucatan, which separates the Gulf of Mexico from the Caribbean Sea, 18 miles to the south-west of Valladolid. It is one of the principal towns of the state, and is worthy of notice chiefly for the remains of an ancient city, comprising a ruined temple 450 feet long, a pyramid with a base of 550 feet square, and a domed edifice ornamented with sculpture.

CHI'CHESTER, a municipal and parliamentary borough and episcopal city in Sussex, 17½ miles east-north-east of Portsmouth. It stands on a plain between an arm of the sea and the South Downs, which rise gently on the north. It is well built, and has wide streets. The two main streets cross at right angles, and meet in an elaborately worked eight-sided cross. Within the suburbs, the city is surrounded by an ancient wall, 1¼ mile in circuit, with some semicircular bastions, and now a promenade under the shade of elms. The cathedral, erected in the 12th and 13th centuries, on the site of a wooden one founded 1108, and burned 1114, measures 410 by 227 feet, with a spire 300 feet high. The aisles are double—a mode of construction to be seen nowhere else in Britain. The cathedral has a rich choir, and portraits of the English sovereigns from the Conquest to George I., and of the bishops down to the Reformation. The chief trade is in agricultural produce and live stock. There are malting, brewing and tanning establishments. Pop. (1871) 9054. C. returns one member to parliament. The harbor, 2 miles to the south-west of the city, is a deep inlet of the English Channel, of about 8 square miles; has several creeks and Thorney Isle; and is connected with C. by a canal. C. was the Roman *Regnum*, and has afforded Roman remains—as a mosaic pavement, coins, urns, and an inscription of the dedication of a temple to Neptune and Minerva. C. was taken and partly destroyed, in 491, by the South Saxons. It was soon after rebuilt by Cissa, their king, and called Cissancaster, or Cissa's Camp. It was for some time the capital of the kingdom of Sussex. In 1642, the royalists of C. surrendered to the parliamentarians, after a siege of ten days.

CHICK PEA (*Cicer*), a genus of plants of the natural order *Leguminosæ*, suborder *Papilionaceæ*, having pinnate leaves; solitary, axillary, stalked flowers; and two-seeded pods, inflated like bladders. The common C. P. (*C. arietinum*) grows wild in the corn-fields of the countries around the Mediterranean Sea, and in many parts of the east. It is an annual, 1½—2 feet high, of a stiff upright habit, covered with glandular hairs. The seeds abound in farina, and have a slightly bitterish taste. They are about the size of common peas, curiously wrinkled, so that they have been thought to resemble a ram's (*arietis*) head. They are used as food, either boiled or roasted, and are the most common *parched pulse* of the East. They are an important article of French cookery. They have been in general use from the earliest times, and the plant is extensively cultivated in Egypt, Syria, India, the south of Europe, &c. Its cultivation extends as far north as the southern parts of Germany; but in the climate of Britain it is found too tender to be a profitable crop. It is the *Gram* of India, and the *Garvance* of the French, whence the English name *Caravances*. The herbage affords a nutritious food for cattle, and the seeds are one of the occasional substitutes for coffee. In great summer heats, drops exude from this plant, which, on drying, leave crystals of almost pure oxalic acid.

CHI'CKEN-POX, a contagious febrile disease, chiefly of children, and bearing some resemblance to a very mild form of small-pox (q. v.). C. is distinguished by an eruption of vesicles or blebs, which rarely become pustular or yellow, and leave only a very slight incrustation, which falls off in a few days, without any permanent mark or pit, as in small-pox. From its vesicular character, it has been called the *crystal pock*. It has been argued that C. is, in fact, only small-pox modified by previous vaccination; but this opinion, though maintained on good authority,

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is not generally received by medical men. It is a disease of little or no danger, the fever being often hardly perceptible, and never lasting long.

CHI'CKWEED (*Stellaria media*), one of the most common weeds of gardens and cultivated fields, is a species of STITCHWORT (q. v.). It is a native of most parts of Europe and of Asia, appearing during the colder months even on the plains of India; an annual, with a weak procumbent stem and ovate leaves, very variable; some of the smaller varieties in dry sunny situations sometimes puzzling young botanists, from having only five or three instead of ten stamens; but always characterised by having the stem curiously marked with a line of hairs, which at each pair of leaves changes from one side to another, and in four changes completes the circuit of the stem. The leaves of C. afford a fine instance of the *sleep of plants*, closing up on the young shoots at night. C. is a good substitute for spinach or greens, although generally little regarded except as a troublesome weed, or gathered only by the poor to make poultices, for which it is very useful, or for feeding cage-birds, which are very fond both of its leaves and seeds. A number of species of a nearly allied genus, *Cerastium*, natives of Britain, also bear the name of C., or MOUSE-EAR C., and the name is occasionally given to other plants, either botanically allied, or of somewhat similar appearance.

CHICLA'NA, a town of Andalusia, Spain, about 12 miles south-east of Cadiz. It is pleasantly situated on a plain between two hills, and its houses being all built of white stone, present a cheerful appearance. It has a splendid hospital. The manufactures are linen, earthenware, and brandy. Its mineral baths are much frequented by the inhabitants of Cadiz. Population variously estimated, but probably about 5000.

CHICOPEE, formerly Cabotsville, and including Chicopee Falls, a manufacturing town of Massachusetts, U. S., on the left bank of Connecticut River, at the mouth of Chicopee River, 5½ miles north of Springfield. Chicopee Falls supplies water power to numerous cotton and woollen factories, paper-mills, brass cannon and bell foundries, and the Ames Manufacturing Company, which makes machinery, swords, bronze cannon, statues, &c. C. has 10 churches and several newspapers. Pop. (1880) 9607; (1880) 11,286.

CHI'CORY, or Su'ccory (*Cichorium*), a genus of plants of the natural order *Compositæ*, sub-order *Cichoraceæ*, distinguished by bracts in two unequal rows, the outer always reflexed, the inner latterly becoming so, a nearly naked receptacle, obovate striated achenia, and a pappus of two rows of minute scales. The species are few in number, herbaceous plants, full of milky juice, natives chiefly of the warmer temperate regions of the eastern hemisphere. The common C. or SUCCORY (*C. Intybus*) is a perennial plant, found wild in England and most parts of Europe, growing in waysides, borders of fields, &c. It has a long carrot-like root, externally of a dirty or brownish yellow color, and white within. The stem rises to the height of 2—5 feet, branching, the leaves are *runcinate*, resembling those of the dandelion; the flowers sessile, axillary, in pairs, rather large, beautiful, generally blue, more rarely pink or white. C. is pretty extensively cultivated, both in England and on the continent of Europe, for its roots. It is also cultivated for feeding cattle with its leaves. The blanched leaves are sometimes used as a salad, and they are readily procured in winter by placing the roots in a box with a little earth in a cellar.—To this genus belongs also the ENDIVE (q. v.).

C. has been used as a substitute for coffee, or to mix with coffee for at least a century. The roots are pulled up, washed, cut into small pieces, and dried on a kiln, which leaves a shrivelled mass not more than one-fourth the weight of the original root. It is then roasted in heated iron cylinders, which are kept revolving as in coffee-roasting, during which it loses about 25 to 30 per cent. of its weight, and evolves at the same time a disagreeable odor, resembling burned gingerbread. An improvement to the C. during roasting is the addition of 2 lbs. of lard or butter for every cwt. of C., which communicates to it much of the lustre and general appearance of coffee. It is then hand-picked, to remove chips of wood, stones, &c., and is reduced to powder, and sold separately as *C. powder* or *C. coffee*, or is added to ordinary ground-coffee, and is sold as a mixture. C. contains a good deal of sugar, but otherwise does not serve to supply the animal economy with any useful ingredient. It gives off a deep brown

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color to water, when an infusion is made, and hence its main use in coffee. Some people dislike the taste of C., and when largely used, it has a tendency to produce diarrhœa; but many people prefer to use coffee mixed with C. owing partly to the taste it communicates, but mainly to the appearance of strength which it gives to the coffee. The C. is liable to adulteration; and roasted beans, peas, carrots, parsnips, marigold-wurzel, acorns, horse-chestnuts, biscuit, oak-bark tan, log-wood and mahogany dust, and even the livers of horses and bullocks, are said to be employed in its adulteration.

CHIEF, in Heraldry, an ordinary formed by a horizontal line, and occupying the upper part of the escutcheon. Like the other honorable ordinaries, the C. ought properly to take up a third part of the shield; but when the other charges are numerous, the C. is frequently diminished in size.—Any object borne in the upper or chief part of the shield is said to be *in chief*, though the C. be not divided off from the rest of the field, as a separate portion.—*On a Chief:* Is when the object is represented on the C., divided off as above described.

CHIEF-JUSTICE. See JUSTICE COURTS.

CHIE'M-SEE, a lake of upper Bavaria, the largest in the country, lies about 42 miles south-east of Munich. It is situated at an elevation of more than 1600 feet above the sea; its length is 12 miles, with a breadth of 9, and its greatest depth 500 feet. Its shape is irregular, and its coast much indented. It has three islands; the Achen and Prien flow into it, and its surplus water is discharged by the Alz into the Inn. The C. is famous for its fish; and a small steamer which plies on it, enables travellers to view its fine scenery.

CHIE'RI, a town of Piedmont, Northern Italy, situated on the slope of a hill 9 miles south-east of Turin. C. is an ancient place. By the later Romans it was called Carea. The church of St. Dominico, built in 1260, has some good paintings; and that of Santa Maria della Scala, built in 1405, is one of the largest Gothic structures in Piedmont. C. is one of the oldest manufacturing towns in Europe, its manufacture of fustians and cotton stuffs dating from 1422. Silk, cotton, and linen are still important manufactures. Pop. 9000.

CHIE'TI, an archiepiscopal city of Italy, capital of the province of the same name, is situated on a hill near the Pescara, about 100 miles north of Naples. It is a well-built and flourishing place, with some imposing public edifices, including a cathedral, lyceum, and theatre; and its agreeable situation has made it the residence of numerous wealthy families. The district around is fertile and well cultivated, and in the city, the cloth and silk manufactures afford employment for a considerable number of people. Pop. 15,000. C. is a very old place, being built on the site of the ancient *Teate* of the Romans, many of the remains of which are still visible. In the year 1524, St. Gaetano founded here the order of the Theatines.

CHIFF-CHAFF (*Sylvia hyppolais*), a small species of warbler, very widely diffused, being found both in England and in the neighborhood of Calcutta. It is common in the south of Europe, is in Britain a summer bird of passage, arriving, however, very early in the spring, and does not extend northward into Scotland. Its general color is brown; the under parts lighter. It is a very sprightly little bird; but its song consists merely of a frequent repetition of two notes resembling the syllables chiff-chaff. It is also called the Lesser Pettychaps.

CHIGNE'CTO BAY, the more westerly of the two inlets at the head or north end of the Bay of Fundy, in British North America. It separates Nova Scotia from New Brunswick, is 30 miles long, and 8 broad, and has an isthmus of only 14 miles in width between it and Northumberland Strait, in the Gulf of St. Lawrence.

CHI'GOE, or Ji'gger, (*Pulex*, or *Sarcopsylla penetrans*), a species of Flea (q. v.), rather smaller than the common flea, and with less powerful limbs, found in the West Indies and South America, where it is excessively troublesome, attacking any exposed part of the human body, and effecting a lodgment between the skin and flesh, often under the skin of the foot or the nails of the toes. At first, its presence is indicated only by a slight itching or tingling; but an ulceration is likely soon to be the result, which is not only very painful, but even dangerous, when the female C. is allowed

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to remain and to deposit her numerous eggs. Before these are deposited, her abdomen becomes distended in an extraordinary manner, as a membranous bag, to the size of a pea. The ulcer speedily contains a great colony of chigoes. The negresses of the West Indies are very expert in extracting the C., which is also removed by washing with tobacco-juice. Rubbing with tobacco-leaves is also employed as a preventive of its attacks.

CHIH-LE, or Pechih-le. one of the northern provinces of China, and the most important of the 18, as being the centre of government, and containing Pekin, the imperial capital, the residence of the emperor and court. Pop. about 28,000,000; area, 58,949 square miles.

CHIHUA'HUA, a city of the Mexican confederation, with 12,000 inhabitants, and a considerable trade between Santa Fé, in New Mexico, and the United States. It is in lat. 28° 40' n., and long. 105° 33' w., and has a cathedral, convents, and an aqueduct 3 miles long, besides appropriate buildings, as the capital of the state of its own name. The territory in question, stretching in lat. from 27° to 32° n., and in long. from 104° to 108 40' w., is divided from Texas, in the United States, by the Rio Bravo del Norte. It is a table-land, more remarkable for mineral resources than for agricultural productions. It abounds in nitre and other salts, and is rich in mines of gold and silver. Pop. 180,000.

CHI'LBLAINS. See CHAPPED HANDS.

CHILD, Sir Josiah, an eminent London merchant, and one of the ablest of the ablest of the earlier English writers on commerce and political economy, born in 1630, was the second son of Richard Child, a merchant of London. His principal work is entitled "Brief Observations concerning Trade and the Interest of Money" (Lond. 1668, 4to); a 2d edition, much enlarged, entitled "A New Discourse of Trade," was published in 1690. In this work he explains his plans for the relief and employment of the poor, including the substitution of districts or unions for parishes, and the compulsory transportation of paupers to the colonies. He was one of the directors, and for some time chairman of the East India Company, and is said to have written several tracts in defence of the trade to the East Indies, which were published anonymously. In 1678 he was created a baronet, and died in 1699.

CHI'LDERMAS, or Holy Innocents' Day (28th December), is observed by the Church of Rome with masses for the children killed by Herod. It was considered unlucky to marry or to begin any work on this day. From Fenn's "Letters" (vol. i. p. 234) we learn that the coronation of King Edward IV. was put off till the Monday, because the preceding Sunday was Childermas Day. The learned Gregory says: "It hath been a custom and yet is elsewhere, to whip up the children upon Innocents' Day morning, that the memory of Herod's murder might stick the closer, and in a moderate proportion to act over the crueltie again in kinde." C. is also a holiday of the Church of England.

CHI'LD-KILLING. See INFANTICIDE.

CHI'LDREN, LEGAL CAPACITY OF. See INFANT, MINOR, PUPIL, GUARDIAN, TUTOR, CURATOR.

CHI'LD-STEALING. See ABDUCTION.

CHI'LI, a republic of Spanish origin, in South America, is the most southerly state on the west side of that continent. It lies wholly between the water-shed of the Andes and the shores of the Pacific, stretching coastwise from Bolivia to Patagonia, in lat. 25° 30'—48° 20' s., and in long. 69 —74°w., having an extreme length of about 1240 miles, and an average breadth of fully 120. Within these limits, however, lies the virtually independent Araiaucan (q. v.) comprising most of the main land to the left of the Biobio while the southern portion is confined chiefly to Chiloe (q. v.) and its archipelago. C. is divided into 16 provinces, of which the aggregate area is officially stated at nearly 130,000 sq. m.; and the pop., in 1875, at 2,068,447. This pop. and area exclude certain regions in Patagonia, over which C. has a merely nominal sway. The capital is Santiago, situated pretty nearly in the heart of the country, and connected with Valparaiso, the principal port, by a railway of 115 miles in length, and also by telegraphic wires. The

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other towns are on or near the ocean; and, to arrange them according to the relative amounts of their trade, they are Valparaiso, Copiapo and Caldera, Coquimbo, Talcahuano and Concepcion, Huasco, Constitucion, and Valdivia. In 1876 the total imports of C. were valued at £7,058,220, and the exports at £7,554,208; in 1874, at £7,688,600 and £7,908,200 respectively. The foreign commerce of C. is carried on mainly with Great Britain. The staple article of export to this country is copper, the value of which, in 1874, was £2,812,013. The articles of export next in importance are, in order of value, wheat, to the value of £1,190,278; silver ore, to the value, in the same year, of £225,968; and wool, £160,637. The principal articles of British produce imported into C. are cotton and woollen manufactures and iron. In 1874, the value of the total imports of cotton fabrics was £1,928,758; that of woollens, £258,288; and that of iron, wrought and unwrought, £465,596. Among the other imports were hard-wares and cutlery, valued at £128,550. The budget estimate of the revenue for the year 1875 amounted to £3,288,000; expenditure, £3,294,978. The internal debt of C. is stated to be (1875) £3,383,204; and the foreign debt, £3,296,200. The army, raised by conscription, was reported to number 3516 men at the beginning of 1875, consisting of 2000 infantry, 712 cavalry, and 804 artillery. The navy, in September 1875, was composed of 10 small steamers, and two large and powerful iron-clads, each of 2900 tons measurement, and of 2500 horse-power, and each armed with six 12½-ton rifled guns.

Roman Catholicism is the prevailing religion, but other beliefs are protected by a law of 1875. In its political constitution, C. appears to be the least democratic republic in the New World. The legislature is composed of two houses. The deputies sit for three years; and the senators are chosen for nine, retiring in thirds at the end of every third year. The voters for a deputy—to say nothing of the still more select voters for a senator—must possess either £100 in real property, or £200 in personal effects, or £20 of income; a pecuniary qualification which is exceptionally doubled for the wealthier localities of Valparaiso and Santiago. In 1848, attempts were made, but in vain, to abolish or modify these restrictions on the suffrage. Under this form of government, C. has maintained a degree of peace and prosperity utterly unknown to the other transatlantic commonwealths of kindred race. In this respect, however, the character of the people has doubtless co-operated with the tendency of the institutions. As contrasted with Spanish America in general, C. contains an unusually large proportion of European blood.

Immediately after the conquest of Peru, C. was seized by Almagro, a companion of Pizarro, subsequently becoming the seat of a captain-generalship, which held sway as far as Cape Horn. In 1810, commenced the war of independence, which, at the close of eight years, was decided against Spain by the victory of Maypo.

Geology.—The predominant rocks of C. are crystalline and metamorphic. They form the range of the Andes, except in those districts in which active volcanoes exist, where they are covered with recent volcanic rocks. They occupy also the whole of the level ground between the mountain-range and the shores of the Pacific, with the exception of a narrow stretch of palæozoic fossiliferous strata which run along the coast south from Santiago for a distance of 300 miles. The coast-line of C. is being continually altered from the elevation of the whole country to an extent of at least 1200 miles along the Pacific shores, produced by volcanic agency. In 1822, the coast was raised 4 feet at Quintero, and 3 feet at Valparaiso. Oysters and other mollusks were left dry, and perished, becoming offensive as they decomposed. The change of level was permanent, over an area of 100,000 square miles, nearly as large as the whole extent of Great Britain and Ireland. A similar extensive elevation was noticed in 1835 by Captain Fitzroy.

Physically, the continental portion of the republic—for its insular section will, in this respect, be noticed under the head of CHILOE—presents many singularities. Of all the maritime regions on the globe, it is perhaps the most isolated. On every side but the sea—and that sea very remote from the main thoroughfares of commerce—it is beset by difficulties of communication. With the lonely wilderness of Patagonia to the south, and the dreary desert of Atacama on the north, it is bounded on the east by a mountain-chain which, altogether impracticable in winter, can be crossed, even in summer, only by a few passes ranging between 12,450 feet and 14,370 in elevation. Moreover, this strip between the Andes and the Pacific is broken into plateaus in the interior, and valleys on the coast, by two longitudinal

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ranges, with numerous lateral spurs; while, throughout the length and breadth, the general level gradually descends, as well to the south as to the west. In point of mere temperature, so rugged a surface—covering fully 15° of latitude, and attaining an altitude of more than 4 miles within about 2° of longitude—must present nearly every possible variety. Through the reciprocal action of the Andes (q. v.) and the prevailing winds, the rain-fall graduates itself, with something of mathematical regularity, from the parching skies of the north, to the drenching clouds of the south—a graduation which, disturbed merely by the melting of the mountain-snows, is, in a great measure, necessarily reflected in the condition and magnitude of the countless water courses. Hence the rivers to the north of the Maypo, which enters the Pacific near latitude 34°, are but inconsiderable streams; while, further to the south, the Maule, the Biobio, and the Calacalla are all to some extent navigable.

From the cause last mentioned, different districts vary remarkably in their productions. To the north of the Coquimbo, about lat. 30°, is chiefly an arid waste, redeemed, however, from being valueless by its mines; and to the south of the Biobio, about lat. 37°, timber and pasturage divide the soil between them. The intermediate centre alone is fitted for agriculture, yielding besides maize and hemp, European grains and fruits in abundance. Notwithstanding all the varieties and vicissitudes of climate, the country may claim to be on the whole extremely healthy. The manufactures are earthenwares, copper wares, linens, cordage, soap, leather, and brandy; and in addition to the wheat and metals already specified, the exports, especially from the south, embrac tallow, hides, jerked beef and live stock. C. had in 1878, 1050 miles of railways. Santiago is connected with Buenos Ayres by a line going over a pass of the Andes 6000 feet high. There are also common roads, but they are neither numerous nor good. In fact, the want of highways and bridges is a serious obstacle to the progress of trade and cultivation. In the basin of the Lower Biobio coal is plentiful.

CHILI, or Chilli. See CAPSICUM.

CHILI NETTLE. See LOASACEÆ.

CHILI SALTPETRE is a commercial name applied to the nitrate of soda. See SODA, NITRATE.

CHILLIANWA'LLA, a village of the Punjab, being 5 miles from the left or east bank of the Jhelum, the most westerly of the five rivers which give name to the country. It is in lat. 32° 40′ n., and long. 73° 39′ e., being 85 miles to the nort-west of Lahore. C. claims notice as the scene of Lord Gough's dearly won victory over the Sikhs, of January 1849, and also as the site of an obelisk erected to the memory of those who fell in the two Sikh wars.

CHILLICO'THE, or Chilicothe, a city of Ohio, U. S., beautifully situated on the right bank of the Scioto River, 45 miles from its confluence with the Ohio, and the same distance south of Columbus, on the Cincinnati and Marietta Railway and Ohio and Erie Canal; has 13 churches, 3 banks, court-house, foundries, steam engine and agricultural implement factories, &c. Founded in 1796, and former capital of the state. Pop. (1870) 8920; (1880) 10,938.

CHILLINGWORTH, William, a famous theologian of the Church of England, was born at Oxford in 1602, and educated at Trinity College in that university, where the arguments of a Jesuit named Fisher, induced him to become a Roman Catholic. He withdrew to Douay; but was induced by his godfather, Dr Laud, then Bishop of London, to re-examine the whole controversy between the Catholics and Protestants, and in 1631, he returned to the bosom of the Anglican Church. Four years later, he published a work, entitled "The Religion of Protestants a Safe Way to Salvation." It was exceedingly keen, ingenious, and conclusive in point of argument. C. was perhaps the ablest disputant of his age; and had there not been a certain fickleness and want of solidity about his intellect, and a nervous suspicion that all human reasoning might be vitiated by undiscovered fallacies, he might have produced a really great work. "The Religion of Protestants" acquired a wide popularity. C. was offered church preferment, which he at first refused—having certain scruples in regard to the subscription of the 39 Articles—but afterwards accepted. He became Chancellor of the Church of Sarum, and prebendary of Brix-

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worth, in Northamptonshire. He was a strong royalist, and on the breaking out of the civil war, accompanied the king's forces. He died January 1644. The best edition of "The Religion of Protestants" appeared in 1742, with sermons, &c., and a life of the author, by Dr Birch.

CHILLON, a celebrated castle and fortress of Switzerland, in the canton of Vaud, 6 miles south-east of Vevay. It is situated at the east end of the Lake of Geneva, on an isolated rock, almost entirely surrounded by deep water, and is connected with the shore by a wooden bridge. The castle is said to have been built in 1238, by Amadeus IV. of Savoy, and it long served as a state prison. It is famous as the prison of Bonnivard, the prior of St Victor, who having by his efforts to free the Genevese, rendered himself obnoxious to the Duke of Savoy, was carried off by emissaries of that potentate, and confined here for 6 years, at the end of which time the castle had to surrender to the Bernese and Genevese, when Bonnivard was liberated. C. has been immortalised by Byron's "Prisoner of Chillon." The castle is now used as a magazine for military stores.

CHILOÉ', the insular province of Chili (q. v.), is an archipelago on the west side of South America, which takes its name from its principal island. It is separated from the rest of the republic, or rather from Patagonia, by the Gulf of Ancud, extending in s. lat. from 41° 40' to 43° 20', and in w. long. from 73° to 74°. The province—which, in 1875, numbered 64,536 inhabitants—contains, in addition to C. Proper, about 60 islets, of which about 30 are uninhabited. In the archipelago are two towns, both of them seaports of C. Proper—Castro, the ancient capital, on the east coast; and San Carlos, the modern seat of government, towards the north-west extremity. The atmosphere, like that of the mainland opposite, is excessively moist; the westerly winds, more particularly in winter, bringing almost constant rains. The climate, however, is on the whole healthy. This fact is the more remarkable, inasmuch as C. Proper is one natural forest, measuring 100 miles by 40, with a partially cleared and cultivated margin on the sea. The chief products are wheat, barley, potatoes, apples, and strawberries; and cattle, sheep, and pigs are reared in considerable numbers. Agriculture, however, is in a very primitive state; and the staple food of many consists of mussels and oysters. The population, equally indolent and poor, differs from that of the rest of Chili in the great preponderance of aboriginal blood. Schools are numerous; but, from the ignorance of the teachers, education has not made satisfactory progress. The principal manufacture is a coarse woollen cloth, dyed blue. This archipelago was discovered by the Spaniards as late as 1558; and as it was the last integral portion of Spanish America to be colonised, so also was it the last to throw off the mother-country's yoke.

CHILOGNA'THA and Chilo'poda. See MYRIAPODA.

CHI'LTERN HILLS, the south part of the low chalk range which runs north-east, about 70 miles, from the north bend of the Thames, in Oxfordshire, through Bucks and the borders of Herts and Beds, and ends in Norfolk and Suffolk. In Oxford, Herts, and Beds, the C. H. are 15 to 20 miles broad, and the highest points are Wendover, 905 feet; and Whitehouse, 893.

CHILTERN HUNDREDS. In former times, the beech-forests which covered the Chiltern Hills, in Buckinghamshire, was infested with robbers, and in order to restrain them, and protect the peaceable inhabitants of the neighborhood from their inroads, it was usual for the crown to appoint an officer, who was called the Steward of the Chiltern Hundreds. The office, which has long ceased to serve its primary, now serves a secondary purpose. A member of the House of Commons cannot resign his seat unless disqualified either by the acceptance of a place of honor and profit under the crown, or by some other cause. Now, the stewardship of the C. H. is held to be such a place, and it is consequently applied for by, and granted, in the general case as a matter of course, to any member who wishes to resign. As soon as it is obtained, it is again resigned, and is thus generally vacant when required for the purpose in question. When the C. H. are not vacant, however, the same purpose is served by the stewardship of the manors of East Hendred, Northstead, and Hempholme. As to the officers which are held to vacate seats, see ELECTION. "The practice of granting the Chiltern Hundreds for the purpose above described began only about the year 1750, and its strict legality

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has been doubted, on the ground that the stewardship is not an office of the kind requisite to vacate a seat. The gift of the Chiltern Hundreds lies with the Chancellor of the Exchequer, and there is at least one instance of its being refused. In 1842, after very awkward disclosures had been made before a Committee of the House of Commons, as to corrupt compromises, which had been entered into for the purpose of avoiding investigation into gross bribery in the election of certain boroughs, of which Reading was one, the member for Reading applied for the stewardship of Chiltern Hundreds, and was refused—the Chancellor of the Exchequer being of the opinion that, by granting it, he would in some sort have made himself a party to the transactions which he did not approve, and of which the House of Commons had implied its condemnation."—"Standary Library of Political Knowledge," p. 500.

CHIMÆ'RA, a genius of cartilaginous fishes, ranked by Cuvier with the Sturgeons (*Sturionidæ*), but now generally regarded as the type of a distinct family, of which only two or three species are known. The gills have a single wide opening, as in the sturgeons; but the gill lid or *operculum* is merely rudimental, and concealed in the skin, whilst there is an approach to sharks in the structure of the gills. The only known species of C. is *C. monstrosa*, occasionally found in the British seas, and more common in more northern latitudes. It is sometimes called the *King of the Herrings*. It pursues the shoals of herrings, and is consequently sometimes taken in herring-nets. It is seldom more than three feet long. Its general color is silvery white, the upper parts mottled with brown. It produces very large leathery eggs.

CHIMÆRA, a mythical monster, described by Homer as having a lion's head, a goat's body, and the tail of a dragon. The rationalistic account of C. is, that it represented a mountain in Lycia whose top was the resort of lions, its middle of goats, and the marshy ground at the bottom of which abounded with serpents. In the same manner, Bellerophon's (q. v.) victory over the C. is explained by saying, that he first made his residence on this mountain. The myth seems, at all events, to have belonged to Asia Minor, as gigantic carvings of the C. on rocks are there found. It is usually represented as a lion, out of the back of which grows the head and neck of a goat.—C. is used figuratively to denote any monstrous or impossible conception, the unnatural birth of the fancy. It is frequently depicted on shields, as a heraldic charge.

CHIMA'PHILA. See WINTER-GREEN.

CHIMBORA'ÇO, a conical peak of the Andes, in Quito, 21,510 feet above the sea, but only about 12,000 above the level of its own table-land. It is capped with perpetual snow, and was long regarded as the loftiest mountain in the world. Latterly, however, it has been ascertained to be overtopped by some peaks, not merely of the Himalayas, but even of the central division of its own chain. Its lat. and long. are 1° 30′ s., and 79° w. The summit was for the first time reached by Stübel in 1872. Humboldt ascended within 2138 feet of it, and Boussingault and Hall within 1729.

CHIME'RE, "the upper robe worn by a bishop, to which the lawn-sleeves are now generally attached." Since the time of Queen Elizabeth, it has been of black satin, but previously it was of a scarlet color, like that worn by the bishops when assembled in convocation, and when the sovereign attends parliament.

CHIMES, music performed on bells in a church tower, either by the hands of a performer or by mechanism. The most perfect C. are to be found in Holland and Belgium.

CHI'MNEY (Fr. *cheminée*, Lat. *caminus*). There seems reason to believe that the C., in its present sense of a funnel from the hearth or fireplace to the roof of the house, is a modern invention. In Greek houses it is supposed that there were no chimneys, and that the smoke escaped through a hole in the roof. What the arrangement was in houses in which there was an upper story, is not known; perhaps the smoke was conveyed by a short funnel through the side-wall of the house, which seems to have been the first form of C. invented in the middle ages. The Roman *caminus*, again, was not a C., but a sort of stove; and it has been a subject of much dispute, whether the Romans had any artificial mode of carrying off the smoke, or whether

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it was allowed to escape through the doors, windows, and openings in the roof. As the climate and the habits of the people both led to the houses of the ancients being very much more open than ours are, it is probable that the occasional fires which they had of wood or charcoal may have given them no great inconvenience. It is known, besides, that the rooms in Roman houses were frequently heated by means of hot air, which was brought in pipes from a furnace below. In England, there is no evidence of the use of C.-shafts earlier than the 12th century. In Rochester Castle (*circa* 1130), complete fireplaces appear; but the flues go only a few feet up in the thickness of the wall, and are then turned out through the wall to the back of the fireplace. the openings being small oblong holes. The earliest C.-shafts are circular, and of considerable height. Afterwards, chimneys are found in a great variety of forms. Previous to the 16th c., many of them are short, and terminated by a spire or pinnacle, having apertures of various shapes. These apertures are sometimes in the pinnacle, sometimes under it, the smoke escaping as from some modern manufacturing C.-stalks, which are built in the form of an Egyptian obelisk. Clustered C.-stalks do not appear until late in the 15th c., when they seem to have been introduced simultaneously with the use of brick for this purpose. Each of the earlier clustered chimneys consists of two flues which adhere to each other, and are not yet separate, as afterwards was the practice. Long after they were invented, and in use for other rooms, our ancestors did not generally introduce them into their halls, which, till the end of the 15th, or the beginning of the 16th c., continued as formerly to be heated by a fire on an open hearth in the centre of the hall, the smoke escaping through an opening in the roof known by the name of *louvre*. In many of the older halls in which chimneys exist, they have evidently been inserted about this period.

The action of a C. depends upon the simple principle, that a column of heated air is lighter than a cooler column of equal height; when therefore a flue full of heated air communicates freely by the lower part with the cooler air around it, the greater weight of the latter pushes the warm air upwards, and thus an ascending current is produced. Other conditions being equal, the draught of a C. will thus be proportional to its perpendicular height, and the difference between the temperature within and without it. The straighter and more perpendicular the C., the stronger will be the draught, because the friction of the ascending current will be less, and the cooling effect of a long and tortuous course will be saved. The maximum efficiency of a given C. is attained when all the air that passes up it enters by the bottom of the fire. In this case, its temperature is raised to the uttermost by passing through the whole of the fire, and the fire is at the same time urged to vivid combustion by the blast thus obtained. A powerful furnace may be constructed by connecting a suitable fireplace, capable of being closed all round excepting at the bottom, with a tall C.; and the amount of draught may be regulated by increasing or diminishing the aperture through which the air is admitted to the bottom of the fireplace, or by an adjustable opening above the fireplace, which will diminish the effective draught as its size is increased, or by a combination of both of these contrivances.

When the fireplace can be enclosed thus, there is little liability to descending currents or "smoky chimneys," as they are called, even when the C. is very short, or has a tortuous course. It is chiefly with open fireplaces that this defect occurs, and the means of prevention and cure is a subject of some interest and importance. As with most other evils, the prevention is far easier than the cure; for by properly constructing the C. in accordance with the principles above stated—by placing the opening of the C. as nearly over the fire, and contracting the open space above the fire, as much as possible—downward smoking may in most cases be easily prevented. When a C. is in the neighborhood of a wall or building nearly as high as itself, or—what is still worse—higher, it is apt to smoke on account of the eddies and other complex currents in the air, caused by the interference which such an obstacle presents to the regular movement of the wind. In towns, such tortuous movements of the atmosphere are very common, and the contrivances for preventing the wind from blowing down the chimneys are very numerous, and often grotesque. Revolving cowls of various forms, but alike in having a nearly horizontal outlet, which is so turned by the wind that the mouth shall always point in the direction opposite to that whence the wind is blowing, are the most common, and usually the most effectual. They are generally constructed of sheet-zinc, with an arrow, a flattened

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pigeon, or other device, as a vane, to determine the rotation of the cowl. The curing of smoky chimneys, in conjunction with the economising of fuel, was one of the favorite subjects of investigation of that very practical philosopher, Count Rumford. He says: "Those who will take the trouble to consider the nature and properties of elastic fluids—of air, smoke, and vapor—and to examine the laws of their motions, and the necessary consequences of their being rarefied by heat, will perceive that it would be as much a miracle if smoke should not rise in a chimney—all hindrances to its ascent being removed—as that water should refuse to run in a siphon, or to descend a river. The whole mystery, therefore, of curing smoky chimneys is comprised in this simple direction: find out and remove those local hindrances which forcibly prevent the smoke from following its natural tendency to go up the chimney; or rather, to speak more accurately, which prevent its being forced up by the pressure of the heavier air of the room."* He then goes on to speak of above 500 smoking chimneys that he has had under his hands, and which were supposed incurable, and states that he was never obliged, "except in one single instance, to have recourse to any other method of cure than merely reducing the fireplace and throat of the chimney, or that part of it which lies immediately above the fireplace, to a proper form and just dimensions.

Most modern chimneys and fireplaces are now constructed in accordance with Count Rumford's suggestions. See GRATE.

One frequent cause of smoky chimneys is the want of sufficient inlet for air to the room. Sand-bags placed under doors, and other devices for preventing ventilation, may cause a well-constructed C. to smoke. Openings must exist somewhere, of sufficient capacity to supply the air which is to ascend the chimney. If the air enters the room on the same side as the fireplace, and sudden gusts of air pass across the front of the fireplace, a temporary descending current is likely to be produced. The openings are best opposite the fire. For the methods of arranging and regulating such openings for the admission of air, see VENTILATION.

Tall factory-chimneys, usually built of brick, are very costly structures, many of them rivalling in height our loftiest cathedral spires. Their construction has been considerably economized by building from the inside, and thus saving the expensive scaffolding. Their walls are built very thick at the base, and gradually thinner upwards: recesses are left at regular intervals in the inside, and stout wooden or iron bars rest upon these to form a sort of temporary ladder for the workmen to ascend; the materials are hoisted by ropes and pulleys.

Sheet-iron chimneys are largely used in Belgium. They are much cheaper, but less durable than brick, and are objectionable on account of their rapid cooling by the action of the external air.

CHIMPA'NZEE (*Troglodytes niger*), a species of ape; one of those which in form and structure exhibit the greatest resemblance to man. It is a native of the warmest parts of Africa, to which also the Gorilla (q. v.), a larger species of the same genus, belongs. The C. is sometimes called the Black Orang, but differs from the Orang (q. v.) (*Pithecus*) of Asia in the proportionally shorter arms, which, however, are much longer than those of man; in the possession of an additional dorsal vertebra, and an additional or thirteenth pair of ribs; and in other particulars, in some of which it more nearly resembles, and in others more widely differs, from the human species. In both the difference from man is very wide in the general adaptation of the structure for movement on all fours and for climbing and moving about among branches, rather than for erect walking, although the C. is able to move in an erect posture more easily than any other ape, usually, however, when so doing, holding its thighs with its hands; and still more in the form of the skull, and consequent aspect of the countenance, the facial angle being as low as 35° in the C. when it is measured without regard to the high bony ridges which project above the eyes; the jaws excessively projecting, and the outline of the face rather concave. There is also an important difference from the human species in the dentition: although the number of teeth of each kind is the same, the canine teeth of the apes is elongated, so as to pass each other, and corresponding intervals are provided for them in the opposite jaw. An interesting point of difference of the anatomy of the C. and Orang

*"Essays: Political, Economical and Philosophical," by Benjamin Count Rumford, vol. i. p. 299.

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from that of man, is in the muscle which in man terminates in a single tendon, and concentrates its action on the great toe, terminating in the apes in three tendons, none of which is connected with the great toe or hinder thumb, but which flex the three middle toes; part of the adaptation of the foot for clasping as a hand. The great toe both of the C. and Orang is shorter than the other toes, and opposed to them as a thumb.

The C. does not seem to attain a height of quite four feet when in an erect posture. Its skin is thinly covered with long black hair in front; the hair is thicker on the head, back and limbs. The ears are remarkably prominent, thin, and naked, not unlike human ears in shape. The nose appears as little more than a mere wrinkle of the skin. The thumb of the hand is small and weak, that of the foot comparatively large and powerful. In a wild state, the animal appears to be gregarious, but its habits are not well known. Truth and fable have been so mixed up in the accounts of it, that new information must be obtained from reliable sources, before even things not in themselves very improbable can be believed. In a state of confinement, it exhibits, at least when young, considerable gentleness and docility, and readily learns to imitate human actions, in eating with a spoon, drinking out of a glass, and the like; but its intelligence does not appear to be superior to that of many other monkeys, or indeed of many kinds of brutes. Its natural food consists chiefly of fruit and other vegetable substances; in confinement, it exhibits a great fondness for sweetmeats and for wine. The C. is impatient of cold, and the climate of Britain soon proves fatal to it.

CHINA. See CHINESE EMPIRE.

CHINA, or China-ware. See PORCELAIN.

CHINA BARK, a name of Cinchona (q. v.) Bark, often to be met in books, and in common use on the continent. It is derived not from the empire of China, but from *Kina* or *Quina*, the Peruvian name of cinchona.

CHINA CLAY, or Ka'olin. See CLAY.

CHINA GRASS, or Chinese Grass, the popular name of a fibre used in China for the manufacture of a beautiful fabric known as *Grass-cloth*. The name appears to have originated in the belief that the fibre was that of a grass; but this is not the case, it being chiefly obtained from *Bœhmeria* (q. v.) *nivea*, a plant allied to the nettle. Besides this and other species of the natural order *Urticaceæ*, other plants, as species of *Corchorus* (q. v.) and *Sida* (q. v.), are believed to yield fibres employed in the same manufacture. The fibres are said not to be spun after the European manner, but joined into long threads by twisting their ends together. Grass-cloth is now brought in considerable quantity to Europe, especially in the form of pocket-handkerchiefs. It has a fine glossy appearance and a peculiar transparency.

CHINANDE'GA, a town of Central America, Nicaragua, stands in a fertile plain at the foot of some mountains, about 18 miles north-west of Leon, and about 10 miles from the Pacific coast. The houses are straggling, of one story, built of adobes, and many of them are enclosed by gardens and plantations. Maize, sugar, cotton, hides, and poultry are produced in the vicinity. Pop. about 10,000. OLD CHINANDEGA, which is contiguous, has a pop. of about 4000.

CHINA ROOT, the root, or rather the *rhizome* (root-stock) of *Smilax China*, a climbing shrubby plant, closely allied to sarsaparilla, and belonging to the same genus; a native of China, Cochin-China, and Japan. See SARSAPARILLA and SMILACEÆ. The stem is round and prickly, the leaves thin and roundish oblong; the rhizome tuberous and large; sub-astringent and diaphoretic. It is occasionally used in medicine, and is imported in a dry state into Europe; but it is also employed in the East as an article of food. It abounds in starch.

CHINCHI'LLA, a town of Spain, in the province of Albacete, 10 miles south-east of the city of that name. It is situated on an abrupt rocky hill, crowned by a castle, and is surrounded by walls. The town is in general well built, with good streets, and a fine parish church, containing some excellent works of art. It has manufactures of cloth, linen, leather, earthenware, and glass, and a trade in the agricultural produce of the district. Pop. 7500.

CHINCHILLA (*Chinchilla*, *Eriomys*, or *Callomys*), a genus of South American

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quadrupeds, of the order *Rodentia;* the type of a family, *Chinchillidæ*, allied to Cavies (*Caviidæ*), but differing from them in possessing clavicles. The general aspect is somewhat rabbit-like. There are several genera of *Chinchillidæ*, distinguished in part by the number of toes; the true chinchillas having four, with the rudiment of a fifth on the fore-feet, and four on the hind-feet; whilst in the genus *Lagidium* or *Lagotis* there are four on each foot; and in *Lagostomus*, four on the fore-feet and three on the hind feet. All the species of this family are gregarious; feed much on roots, for which their strong and sharp incisors are particularly adapted; and live either in holes, which they select for themselves in rocky districts, or in burrows, which they excavate. They are valued for their fur, particularly the CHINCHILLA of the Andes (*C. Lanigera*), of which the fur constitutes an important article of commerce. Their numbers are said to be sensibly decreasing in consequence of the demand for the fur. The ancient Peruvians were accustomed to employ the wool of the C. for the manufacture of fine fabrics. Molina suggests, that it might easily and profitably be kept in a domesticated state.

CHINCHO'N, a town of Spain, in the province of Madrid, 25 miles south-south-east of the city of that name. It is pleasantly situated on a hill near the Tagus, and is well built, with wide, regular, and clean streets. Agriculture forms the chief occupation of the inhabitants, but leather, linen, and earthenware are manufactured to a small extent. Pop. 5400.

CHINDWA'RA, a town in the Central Provinces of India, lat. 22° 3' n., and long. 78° 53' e. It occupies a plateau amid the Deoghur Mountains, standing 2100 feet above the level of the sea. Its climate is consequently one of the most agreeable and salubrious in India, attracting many visitors in search of health or recreation. Pop. (1872) 8626.

CHINE, La, a village of the Dominion of Canada, on the south side of the island of Montreal, and about 9 miles to the west of the city of that name. Both the city and the village stand on the left bank of the St Lawrence, or rather, of a branch of the Ottawa; for here, and at least 10 or 12 miles further down, these united rivers keep their waters unmingled. As the intermediate portion of the stream forms the Rapids of St Louis, the consequent interruption of the navigation naturally rendered La C. a turning-point between the maritime and the inland communications. Gradually, however, its importance in this respect has been diminished, if not extinguished, by works between it and Montreal—a canal, a railway, and even improvements in the rapids themselves. The pop. in 1871 was 1696.

CHINESE EMPIRE, a vast territory in Eastern Asia, comprehending five great divisions—viz., 1. Mantchuria (q. v.); 2. Mongolia (q. v.); 3. Turkestan (q. v.); 4. Tibet (q. v.); 5. China Proper, or the Eighteen Provinces (*Shih-pā-seng*), including the two large islands of Formosa and Hainan—the former being reckoned in the province of Fuh-keen, and the latter as a department of Kwang-tung.

China Proper occupies the eastern slope of the table-lands of Central Asia. In form it approaches to a square, and covers a surface eighteen times as large as Great Britain. It is inhabited by more than 360 millions of the human race, living under the same government, ruled by the same laws, speaking the same language, studying the same literature, possessing a greater homogeneity, a history extending over a longer period, and a more enduring national existence than any other people, whether of ancient or modern times; indeed, when we consider its high antiquity, its peculiar civilisation, its elaborate administrative machinery, its wondrous language, its philosophy and classic literature, its manufacturing industry and natural productions, giving rise to such a gigantic commerce with our own land, China is perhaps the most remarkable country in the world, and is worth a closer and more serious study than has yet been generally accorded to it. China Proper is included between 18° and 40° n. lat. (which takes in the island of Hainan), 98°—124° e. long. Its coast-line exceeds 2500 miles, and the land-frontier 4400 miles. A line running direct north and south would give a length of 1474 miles; and another at right angles to this, 1355 miles; but one drawn diagonally from its north-eastern extremity through Yun-nan would measure 1669 miles. The area of China Proper is usually given as 1,297,999 square miles; but Dr Williams considers that the entire dimensions of the 18 provinces, as the Chinese define them, cannot be much under 2,000,000

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square miles. All these measurements, however, must be taken as mere approximations.

Physical Features.—China has a general slope from the mountains of Tibet to the shores of the Pacific. The two principal mountain-chains divide it into three longitudinal basins, drained by those great rivers for which China is famous. Within its provinces are found alluvial plains, fertile river-valleys, large populous towns, as well as thinly inhabited, hilly and mountainous regions. To describe its surface more particularly, it may be viewed under its natural divisions of mountainous country, hilly country, and the Great Plain. The first comprehends more than half the region between the meridian 118° and Tibet. East of this meridian, and to the south of the Yang-tze-kiang river, is the hilly country, which includes the provinces of Fuh-keen, Keang-se, Kwang-tung, and a portion of Hu-nan and Hu-pih; while to the north-east stretches the Great Plain. This latter extends from the Great Wall to 30° n. lat.: a line drawn from King-chow in Hu-pih to Hwae-king on the Yellow River, may be considered its western limit; and the sea forms its boundary on the east. This vast and generally fertile tract has an area of 210,000 square miles, and supports a population of 177 millions.

From the mountains of Tibet two grand ranges stretch across China, having a general direction from south-west to north-east. The more northerly of these—the Tsin-ling or Blue Mountains—are included between the parallels of 31° and 34°. The southern or Nan-ling chain is a spur of the Himalayas. Commencing in Yun-nan, it bounds Kwang-se, Kwang-tung, and Fuh-keen on the north, and passing through the province of Che-keang—where some of its peaks reach the height of 12,000 feet—enters the sea at Ning-po; thus forming a continuous barrier—penetrated only by a few steep passes, of which the Mei-kwan, or Mei Pass, is the best known—that separates the coast-land of South-eastern China from the rest of the country. This great chain throws off numerous spurs to the south and east, which, dipping into the sea, rise above it as a belt of rugged islands along the southern half of the Chinese sea-board. Of this belt, the Chusan Archipelago is the most northerly portion.

The magnificent *river-system* of China is represented by those noble twin streams, the Hoang-ho or Yellow River, and the Yang-tze-kiang, which, springing from the same water-shed, the eastern mountains of Tibet, are widely separated in their mid course, but enter the sea within 2° of each other. The former has its source in 35½° n. lat., and about 96° e. long.; and after a very tortuous course empties itself into the ocean in lat. 34°.* It is a "mighty, impracticable, turbid, furious stream" for the most part, and little adapted for Chinese navigation. But the river most beloved by the Chinese is the Yang t e-kiang, or "son of the ocean,"—more correctly translated, "the son that spreads"—which name is only applied is it by the natives below the commencement of the delta: for above that it is called simply Ta-kiang or great River. The basin drained by it is estimated at 780,000 square miles. Of the other rivers that water the country, the Peiho in the north, and the Choo-keang in the south, are the most noteworthy. The principal *lakes* of China are five in number—viz., the Tung-ting-hu, 113° e. long, with a circumference of about 220 miles; the Poyang-hu, in 116° e. long., 90 miles in length by 20 in breadth, the Hung-tsin-hu, in Keang-su; the Tsan-hu, between Ngankin-fu and Nankin; and the Taihu, in 120° e. long. On these lakes, artificially constructed floating-islands, with houses, fields, and inhabitants, animals, and birds, are sometimes seen.

The *Grand Canal* has very greatly facilitated the internal navigation of the country. Until lately the great annual grain-fleet, with its 430,000 tons of rice for the use of the capital, passed from the south to the neighborhood of Pekin by this great water-way; thus avoiding the storms and pirates of the coast, but the alteration already mentioned in the course of the Hoang-ho, has rendered it comparatively useless. It connects Tien-tsin in Chih-le with Hang-chow in Che-keang; though the canal proper commences in Shan-tung, and its total length is about 650 miles.

Another world-famous structure is the *Great Wall*—called Wan-li-chang (myriad-

* The Hoang-ho has recently altered its course, and now enters the sea in a somewhat higher latitude. Such changes, causing losses, and entailing expense, are not unusual; and hence this river has been called "China's sorrow."

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mile-wall) by the Chinese—which was built by the first emperor of the Tsin dynasty about 220 B.C., as a protection against the Tartar tribes. It traverses the northern boundary of China, extending from 3½° e. to 15° w. of Pekin, and is carried over the highest hills, through the deepest valleys, across rivers and every other natural obstacle. The length of this great barrier is, according to M'Culloch, 1250 miles. Including a parapet of 5 feet, the total height of the wall is 20 feet; thickness at the base, 25 feet; and at the top, 15 feet. Towers or bastions occur at intervals of about 100 yards. These are 40 feet square at the base, and 30 feet at the summit, which is 37 feet, and in some instances 48 or 50 feet, from the ground. Earth enclosed in brickwork forms the mass of the wall; but for more than half its length it is little else than a heap of gravel and rubbish.

Geology.—The high lands, where are the sources of the great rivers of China, consist of granitic and metamorphic rocks. These are continued round the south and south-east of the country, until they leave a huge basin, through which flow the Yang-tze-kiang and Hoang-ho, occupied by fossiliferous strata. The wild and rugged scenery of the larger portion of China is owing to the predominance of those crystalline and sub-crystalline rocks. The fossiliferous strata exhibit representatives of the various formations. The Palæozoic rocks are but sparingly developed in a narrow stripe which runs from near Pekin, in a south-westerly curve, to nearly the centre of the empire. Cretaceous rocks occur in the valley of the Yang-tze-kiang. Tertiary beds fill up the eastern portion of the immense basin; while extensive districts to the west of this region, extending to the crystalline rocks in the extreme west, are covered with modern detritus.

Though no active volcanoes are known to exist except one in Formosa, yet indications of volcanic action are not wanting. Salt and hot-water-springs are found in Yun-nan; sulphur springs near Foo-chow; and wells of petroleum in Shen-se and Formosa. The most famous amongst the *minerals* of China is jade or the yu-stone, obtained chiefly in Yun-nan. Coal, limestone, and porcelain clays are abundant. Precious stones are said to be met with in some districts. In Yun-nan, gold is washed from the sands of the rivers, and in the same province silver-mines are worked; here, too, is obtained the celebrated pe-tung or white copper. All the commoner metals are likewise found in China. Near the city of Ning-po are extensive stone-quarries.

Vegetable Productions.—Our knowledge of the flora of China has been much advanced by the researches of Mr. Fortune; and his works contain valuable notices of the geography, culture, and varieties of the tea-plant, and of the botany of the country generally. The tea-plant (*Thea viridis* and *Thea bohea*) is the most important vegetable production of China. See art. TEA. The tallow-tree (*Stillingia Sibifera*), the *Dryandra cordata* or varnish-tree, the camphor-tree (*Laurus Camphora*), the Chinese pine (*Pinus Sinensis*), the Chinese banyan (*Ficus nitida*), the funereal cypress—introduced into this country by Mr. Fortune—and the mulberry, are amongst the most important trees of China. The cocoa-nut and other palms flourish on the southern coast. Of the bamboo, which grows as far north as lat. 38°, there are 63 principal varieties; and it is said that the bamboos of China are more valuable than her mines, and, next to rice and silk, yield the greatest revenue. The various uses to which they are applied is truly astonishing; and, amongst others, the bamboo is famous as an instrument of punishment. The fruits of both the tropical and temperate zones—apples, grapes, pomegranates, mangoes, pine-apples, three species of orange, the lichi, etc.—are found in the country; and camellias, azaleas, and gardenias are natives of the "Flowery Land." The *nymphæa*, or water-lily, is greatly prized by the Chinese, both for ornament and in an economical point of view. *Agriculture* is held in higher estimation in China than, perhaps, any other country in the world. On the first day of each year, a grand state-ceremony is performed in its honor. The emperor, accompanied by his great officers of state, repairs to the Sacred Field, and having offered sacrifices on an altar of earth, he traces a furrow with the plough, and his example is followed by princes and ministers. A like solemnity is celebrated by the governor of every province, who represents the emperor. The agricultural system of the Chinese is rude, but effective; and every inch of arable land is carefully cultivated. Spade-husbandry and irrigation are carried on to a great extent. The Chinese have a strong perception of the value of night-soil as a manure; for,

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whilst in this country thousands of pounds' worth are annually thrown into the Thames, in China it is everywhere saved, bears a high price, and is collected in a manner exceedingly offensive to European notions. In the northern provinces, the cereals are principally maize, barley, and wheat; but in the south, rice is raised in vast quantities, and forms the staple food of the people. Tobacco and the poppy are also raised in considerable quantities.

In a country of such vast extent—extending from 18° to 40° n. lat.—the *climate* must vary greatly. Indeed, as regards both climate and productions, China may be divided into three zones—the northern, the central, and the southern. The northern zone extends to the 35th parallel, and includes the fine provinces of Shang-tung, Chih-le, Shan-se, Shen-se, and Kan-su. It produces the grains, fruits, and animals of Northern Europe. Here the children are red-cheeked, and the extremes of heat and cold are great. In Chih-le, the winters are very severe; and at that season ice a foot thick renders the rivers unnavigable. The natural productions of this and the contiguous northern provinces are wheat, barley, oats, apples, the hazel-nut, and the potato; they are also rich in wood and minerals. The central zone, the richest portion of China, contains eight provinces—Sze-chuen, Kwei-chow, Hu-nan, Hu-pih, Keang-su—and is bounded by the 27th or 28th parallel; tea and silk are its characteristic products; the middle portion is the granary of China, and the eastern part is celebrated for its manufactures of silk and cotton. The southern zone embraces five provinces—Yun-nan, Kwang-tung, Kwang-se, Fuh-keen, and Che-keang. The exchange of its tropical productions for those of the northern zone is an important branch of the internal commerce of the country. Kwang-tung lies partly within the tropics; and the whole province is tropical, both in climate and productions. The following table (no later census has been made) exhibits the situation, area, and population of the eighteen provinces into which China is divided for administrative purposes:

Provinces.	Population. Census of 1812.	Square Miles.	Pop. per. Square Mile.
Northern Provinces—			
Chih-le	27,990,871	58,949	475
Shang-tung	28,958,764	65,104	444
Shan-se	14,004,910	55,268	252
Ho-nan	23,037,171	65,104	420
Eastern Provinces—			
Keang-su	37,843,501	44,500	850
Gan-hwuy	34,168,059	48,461	705
Keang-se	23,046,999	72,176	320
Che-keang	26,256,784	39,150	671
Fuh-keen	14,777,410	53,480	276
Central Provinces—			
Hu-pih	27,370,098	70,450	389
Hu-nan	18,652,507	74,320	251
Southern Provinces—			
Kwang-tung	19,174,030	79,456	241
Kwang-se	7,313,895	78,250	93
Yun-nan	5,561,320	107,969	51
Kwei-chow	5,288,219	64,554	82
Western Provinces—			
Shen-se	10,207,256	67,400	153
Kan-su	15,193,125	86,608	175
Sze-chuen	21,435,678	166,880	128
Totals	360,279,897	1,298,079	277

But, according to the "Almanach de Gotha" for 1877, the population of C., properly so called, was estimated at 405,000,000; and of the rest of the empire, including Mantchuria, Mongolia, Tibet, and Corea, 28,000,000—in all, 433,000,000. After Pekin, the capital, the largest cities in China are Canton, Tien-Tsin, Foochow, Hankow, Hang-chow-foo, Ning-po, Amoy, Shanghai, &c.

Inhabitants.—Ethnologically, the Chinese belong to that variety of the human

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species distinguished by a Mongolian conformation of the head and face, and a monosyllabic language. See CHINESE LANGUAGE, WRITING, AND LITERATURE. A tawny or parchment-colored skin, black hair, lank and coarse, a thin beard, oblique eyes, and high cheek bones, are the principal characteristics of the race. The average height of the Chinaman is about equal to that of the European, though his muscular power is not so great; the women are disproportionately small, and have a broad upper face, low nose, and linear eyes. Of the general character of the Chinese, it is not easy to form a fair and impartial judgment; and those who have resided long in the country, and know them well, have arrived at very different conclusions. M. Huc asserts that they are "destitute of religious feelings and beliefs," "sceptical and indifferent to everything that concerns the moral side of man," "their whole lives but materialism put in action;" but "all this," says Mr Meadows, "is baseless calumny of the higher life of a great portion of the human race." He admits, indeed, that these charges are true of the mass of the Chinese, just as they are true of the English, French, and Americans; but as amongst these there is a large amount of generosity and right feeling, and also a "minority higher in nature, actuated by higher motives, aiming at higher aims," so also, he maintains, is there amongst the Chinese a similar right feeling, and a like minority who live a higher life than the people generally. See HIOUEN-THSANG. As regards valor, their annals record "deeds akin to the courage of antiquity;" they have no fear of death, commit suicide as the solution of a difficulty, and endure the most cruel tortures with a passive fortitude; [redacted] neither their arms nor discipline enable them to stand before European forces. The Chinese are, as a race, unwarlike, fond of peace and domestic order, capable of a high degree of organisation and local self-government, sober, industrious, practical, unimaginative, literary, and deeply imbued with the mercantile spirit. It is to be observed that the inhabitants of China Proper are essentially one people; the differences, except in dialect, being hardly more marked than between the Northumbrian peasant and the Cornish miner. The south-eastern Chinese—the people of Kwang-tung, Fuh-keen, and the south of Che-keang—are the most restless and enterprising in all the eighteen provinces, and may be regarded as the Anglo-Saxons of Asia. In the mountainous districts of the four south-eastern provinces of China, but principally in Kwang-se, are certain tribes who maintain a rude independence, wear a peculiar dress, and are descended from the aboriginal inhabitants of China. Of these, the Meaou-tze are the best known.

The *manners and customs* of the Chinese can only here be glanced at. The *worship of ancestors* is a remarkable and prominent feature in their social life, and is dictated by that principle of filial piety which forms the basis of Chinese society. The rich have in their houses a chamber—a kind of domestic sanctuary—dedicated to their forefathers. Tablets, representing the deceased persons, and inscribed with their names, are here carefully preserved; and at stated seasons, prostrations and ceremonies are performed before them according to the Book of Rites. All Chinese worship from time to time at the tombs of their parents. In everything that relates to death and sepulchre, the customs of the Chinese are no less singular. They meet their last enemy with apparent unconcern; but whilst their future state troubles them little, they regard the quality of their coffins as of vital importance, and frequently provide them during their lifetime; indeed, a coffin is reckoned a most acceptable present, and is frequently given by children to their parents. "To be happy on earth," say the Chinese, "one must be born in Su-chow, live in Canton, and die in Lianchau"—Su-chow being celebrated for the beauty of its women, Canton for its luxury, and Lianchau for furnishing the best wood for coffins. Yet death is never alluded to in direct terms, but indicated rather by periphrases, such as—the person "exists no more," "he has saluted the age," "ascended to the sky," &c. Banquets are offered to the dead, and pathetic speeches addressed to them. In China, *marriage* is universal, and within the reach of all; but there is a strict separation of the sexes, and betrothal is undertaken by the parents or by professional matchmakers. Minute ceremonial observances regulate every step, and frequently the bride and bridegroom see each other on the wedding-day for the first time. Women hold a very inferior position, and are little better than slaves. Polygamy is not recognized by law, but secondary wives are common, especially when the first proves barren. Infanticide, though regarded as a crime, is undoubtedly practiced to some extent, as is proved by edicts issued against it; and

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parents possess almost unlimited authority over their children. The intercourse of the Chinese with each other, especially of the upper classes, is regulated by a tedious and elaborate etiquette; indeed, they are the slaves of custom, and everything is done by precedent. Many curious instances of Chinese politeness might be cited. The well-bred host presses many things on a visitor which the latter must never dream of accepting. "A Chinaman," says Mr Oliphant, "has wonderful command of feature; he generally looks most pleased when he has least reason to be so, and maintains an expression of imperturbable politeness and amiability when he is secretly regretting devoutly that he cannot bastinade you to death." The *Le-king*, or Book of Rites, regulates Chinese manners, and is one cause of their unchangeableness; for here they are stereotyped, and handed down from age to age. The ceremonial usages of China have been estimated at 3000; and one of the tribunals at Pekin—the Board of Rites—is charged with their interpretation. Chinese cookery, in the use of made dishes, more nearly resembles the French than the English. Birds'-nests soup, sharks' fins, deer-sinews, and ducks' tongues are amongst its delicacies. The wine, or weak spirit (*tsew*), more correctly speaking, used by the Chinese is made from rice; and from this, again, they distil a stronger spirit, the "samshoo" of Canton. The former is drunk warm in minute cups at their meals; tea never appears during a repast, though it may be taken before or after. The Chinese have numerous *festivals;* and perhaps the most remarkable of these is that celebrated at the commencement of the new year, when unbounded festivity prevails. Preparatory to this, debts are settled, and the devout repair to the temples to gain the favor of the gods. The first day of the year may, in one sense, be reckoned the birthday of the whole people, for their ages are dated from it. Visiting is, at the same time, carried on to a great extent, whilst parents and teachers receive the prostrations and salutations of their children or pupils. The festival of the dragon-boats is held on the fifth day of the fifth month; and at the first full moon of the year, the feast of lanterns. In the manufacture of these the Chinese excel; and on the night of the festival, the lanterns illuminate each door, wonderful in their variety of form and material.

In the matter of *dress*, the Chinaman exhibits his usual practical sense, and varies the material according to the season, from cotton-wadded or fur-lined coats to the lightest silk, gauze, or grass-cloth. On the approach of cold weather, he lights no fire in his dwelling, but puts on additional clothing until the desired temperature is attained. A tunic or kind of loose jacket fitting close round the neck, and a wide short trouser, are his principal garments. Shoes are made of silk or cotton, with thick felt soles. White is the color of mourning. The Tartar tonsure and braided queue became general with the Mantchu conquest of the country, since which 180 millions of men have the hair removed from the head at short intervals; and as no Chinaman is his own barber, a great number of this calling finds employment. The Chinaman is very sparing in his ablutions, and appears to be afflicted with a strange hydrophobia; for cold water, either as a beverage, or for washing his person, he holds in abomination. Long nails are fashionable. The costume of the women differs but little from that of the men, and their shoes are the most remarkable part of their toilet. A lady's shoe measures about 3½ inches from the heel to the toe. The feet of the Tartar women are left as nature made them; but amongst the Chinese, all young girls of the better classes are crippled by a tyrant custom. In early infancy the feet are tightly bound, the four small toes being tucked under the sole, of which, after a time, they become a part, and the heel is brought forward. The process is at length complete; stumps have been substituted for the ordinary pedal extremities, and the Chinese lady totters on her goat's feet.

The principal *manufactures* of the Chinese are silk, cotton, linen, and pottery, for which latter they are especially celebrated. The finest porcelain is made in the province of Keang-se. The Chinese invented printing in the beginning of the 10th C., and in 932 A.D. a printed imperial edition of the sacred book was published. The skill of the Chinese in handicraft is astonishing. Their rich silks and satins, light gauzes, beautiful embroidery, elaborate engraving on wood and stone, delicate filigree-work in gold and silver, carvings on ivory, fine lacquered ware, antique vessels in bronze, and their brilliant coloring on the famous pith paper, command our admiration.

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Of the grand modern discoveries in the *physical sciences* the Chinese are profoundly ignorant, and the study of nature is altogether neglected. The Chinaman objects to be wiser than his forefathers, but spends a lifetime in studying his classical literature and the sages of antiquity; and here is doubtless one great cause of the homogeneity of the race, and the stereotyped nature of the Chinese mind.

Of *animal physiology and medicine* the Chinese have very crude notions, as is shown by their *scheme* of the human body, in which the heart is placed in the centre, with the other organs ranged round it, and their unphilosophical theory of the pulse, which plainly demonstrates that they are ignorant of the true circulation of the blood and the vascular system in man; hence their practice of medicine must be empirical. Chinese physicians believe that man is composed of five elements; that so long as each maintains its due proportion, health is preserved; but should one gain the ascendancy, illness follows, and the equilibrium must be restored by proper remedies. Acupuncture is practised. The Chinese have had the opportunity of practically testing the superiority of Western medical science, by the establishment of English and American hospitals, the introduction of vaccination, and by the publication of popular treatises on Physiology and Practical Surgery, etc., by Dr. Hobson, late of Canton. It is worthy of remark that these books were eagerly sought after, and excited a deep interest amongst their *literati;* indeed, the Physiology has been twice republished by persons holding high official situations at Canton, and in a preface to the Chinese edition, the publisher observes: "Our science, indeed, cannot compete with that of the philanthropic author."

Animals.—Very little is really known of the zoology of China. Some of the more ferocious of the carniverous animals still linger in the jungles of Yun-nan, and are occasionally found along the whole of the Nauling range of mountains as far as Ning-po, where there is a mart for their skins. Wild cats are common in the forests of the south, the bears are still found in the hills of Shan-se. Of the ruminantia, there are the musk-deer (*Moschus moschiferus*), the moose-deer, and a few other species. The gold and silver pheasant, the argus pheasant, and other gallinaceous birds, hold a prominent place in the ornithology of China. Fly-catchers, thrushes, grackles, and goat-suckers have their representatives in China, and there are several species of crows, jays, and magpies. Water-fowl inhabit the lakes, rivers, and marshes. The larger reptiles are unknown; but tortoises and turtles abound on the coast, and lizards are plentiful in the south. The ichthyology of China is considered to be one of the richest in the world. Sharks, rays, sturgeons, and other cartilaginous fishes, are common on the coast, and the carp formerly was very plentiful in the lakes and rivers. The goldfish has been introduced into Europe from China. Of insects, the arachnidæ are large and numerous; indeed, a tree-spider captures and kills small birds. Locusts often commit extensive ravages. Silk-worms are highly valued, and reared in large numbers.

Government.—In the centralised autocratic government of China, the emperor is absolute in the empire, the governor in the province, the magistrate in the district. The emperor claims no *hereditary* divine right, and is not always the eldest son of the preceding monarch; the ablest son is nominated, but his right to the throne as the *Teen-tze*, or *Tien-tze*, "son of heaven," the *Fung-tien*, "divinely appointed," can only be established by good government, in accordance with the principles laid down in the national sacred books. If, on the contrary, he violates these principles, the people firmly believe that heaven signifies, by unmistakable signs, that their ruler is not its chosen representative. "The rivers rise from their beds, the ground sullenly refuses its fruits, the plains tremble, the hills reel, and the typhoon rages over seas and coasts, all alike uttering a "Numbered, numbered, weighed and parted," that requires no interpretation, but is read in anxiety by the people, in dismay and terror by the prince," who seeks by repentance, and a return to the true principles of the government, to avert his doom. The emperor is absolute as legislator and administrator; but he must legislate in accordance with the general principles acknowledged in the country. He also constitutes in his own person, the highest criminal court. The Chinese possess a carefully digested code of laws, which is added to and modified from time to time by imperial edicts. Their penal code commenced 2000 years ago, and copies of it are sold at so cheap a rate as to be within reach of people of the humblest means. Death, which the

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Chinaman prefers to long confinement, is the penalty for a large number of offences, and in ordinary years about 10,000 criminals are executed. Several modes of torture are legal. The emperor is assisted in governing by two councils.—1. *The Inner or Privy Council*, composed of six high officials, three of whom are Chinese and three Mantchus. The four senior ministers exercise functions corresponding to those of an English prime-minister. 2. *The General or Strategical Council*, which closely resembles our cabinet; being composed of the most influential officers in the capital, who exercise high legislative and executive duties. Under these are six *yamuns* or colleges of government, each charged with a distinct department of government. Over all is the Court of General Inspection, or the *Censorate*, as it is called by foreigners. The mandarins composing this number from 40 to 50; they are "the eyes and ears of the emperor;" for it is their province to see that all officers of the government, provincial or metropolitan, are faithful in the discharge of their respective duties; and they alone have the right to make representations or complaints to the emperor.

The *administrative machinery* of the Chinese is very perfect in its organisation, and demands an attentive consideration for the right understanding of the people and government. In each of the 18 provinces is an imperial delegate or governor, who, besides being at the head of the civil jurisdiction, is the commander-in-chief, and possesses the power of life and death for certain capital offences. He is privileged to correspond with the cabinet-council and the emperor. Under the governor are the Superintendent of Provincial Finances, the Provincial Criminal Judge, and the Provincial Educational Examiner; each communicates with his especial board in Pekin. The governor is also assisted by many other judicial and administrative officials. The governmental organisation of each province is complete in itself, but in a few instances two provinces—Kwang-tung and Kwang-se, for instance—form a viceroyalty, over which a governor-general, in addition to the governors, exercises authority. Every province is again subdivided into districts, departments, and circuits. The average number of districts in a province is eighty, and each of these is about the size of an English county. A civil functionary, called sometimes the district-magistrate, presides over this division, and is assisted by several subordinate officers. A group of districts—six is the average number for the whole 18 provinces—forms a department, and is ruled by a prefect, who resides in the *fu* or departmental city. Three departments, on an average, constitute a circuit, of which an intendant (Taoutse) has the charge.

The several grades of mandarins, or Chinese government officials (Chinese name, *kwan-fu*), are distinguished chiefly by a different-colored ball or button on the top of the cap. There are twelve orders of nobility confined to the imperial house and clan, and also five ancient orders of nobility open to the civil and military servants of the state. The normal government of China is less a despotism than a morally supported autocracy, and it is in principle paternal. What the father is to his family, that the governor, the prefect, and the magistrate are intended to be, each in his own sphere, to the people; whilst the emperor stands in the same relation to the myriad inhabitants of his vast dominions. In ordinary times, the Chinaman enjoys much practical freedom, and can travel through the country without passport, or follow any calling he likes.

The Chinese executive system is based on those noteworthy *competitive examinations* which are intended to sift out from the millions of educated Chinese the best and ablest for the public service. The first examination takes place every three years in the capital of each department, when the lowest degree—that of bachelor—is conferred on a certain number of candidates from each district. Triennial examinations are held in the provincial capital, presided over by two examiners from Pekin, at which sometimes as many as 10,000 bachelors present themselves, and compete for the degree of licentiate. Some 1,200 obtain it, and these may attend the triennial metropolitan examination at Pekin, when about 200 may hope for the coveted degree of doctor, which insures immediate preferment.

Mr Meadows, the most philosophical, perhaps, of our writers on China, and from whose works the foregoing sketch of the administrative system of the country has been chiefly derived, has entered very fully into what may be termed the *philosophy of Chinese government*, which he sums up in the following doctrines, and believes them to be deducible from the classic literature of the country, and the true causes

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of the wonderful duration of the Chinese empire. 1. That the nation must be governed by moral agency, in preference to physical force. 2. That the services of the wisest and ablest men in the nation are indispensable to its good government. 3. That the people have the right to depose a sovereign who, either from active wickedness or vicious indolence, gives cause to oppressive and tyrannical rule. And to these he adds an institution—the system of public-service competitive examinations. But, on the other hand, these examinations, by directing the attention of students solely to the ancient literature of the country, to the exclusion of the physical sciences and inductive philosophy, however efficient in producing that wonderful homogeneity for which the inhabitants of the Central Kingdom are famous, stunt and stereotype the national mind, which, like the dwarfed tree the Chinaman delights to raise in a flower-pot, or the feet of a Chinese girl, can never fully expand.

Education, as the high road to official employment, to rank, wealth, and influence, is eagerly sought by all classes. Literary proficiency commands everywhere respect and consideration, and primary instruction penetrates to the remotest villages. Self-supporting day-schools are universal throughout the country, and the office of teacher is followed by a great number of the *literati*. Government provides state-examiners, but does not otherwise assist in the education of the people. The Chinese have a remarkable reverence for the written character. Waste printed paper is collected from house to house and burned, to preserve it from profanation.

Army.—According to the "Pekin Gazette," China has a prodigious army, but in reality the greater part figures only on paper. Each province is provided with a military force varying from 8000 to about 68,000 men. According to Mr Meadows, the average for each province is about 34,500 men, and 640 officers. The governor of a province is also commander-in-chief, and is assisted by a general-in-chief, as well as lieutenants and majors general. The Chinese and Tartar troops form two important divisions of the army. The Tartar garrisons are indeed the real strength of the Mantchu emperor. That at Pekin is 150,000 strong; and 18 others, averaging each about 3000 men, are dotted about the provinces, forming, with their wives and children, military colonies. These troops, which are armed with good two edged swords, and serviceable matchlocks, or the national bow, have alone been able to stand against the victorious Tae-ping rebels, and turn them from the capital. According to the most recent statistics (see "Die wirthschaftlichen Zustände im Süden und Osten Asiens," Stuttg. 1871), the army is composed of 678 companies of Mantchus, of 100 men each, of 211 companies of Mongols, of 106,000 Chinese cavalry, and of 500,000 Chinese infantry, besides a large body of irregular militia—in all 850,000 men. The Tartar infantry-soldier receives four taels a month, and the trooper four and a half. The Marquis de Moges (see Baron Gros's Embassy, thinks that "two regiments of chasseurs and two regiments of Zouaves would suffice to conquer China." "There is not," he says, "a corps in the empire that could stand fast under a bayonet charge." This, however, is no longer the case. The native troops in all the large cities of the empire are drilled after the European fashion, and armed with the Snider and other breech-loading rifles; and in the opinion of intelligent English residents, the next Chinese war will be a very different affair from anything that has preceded it.

Navy.—The imperial navy is divided into river and sea-going vessels. The former amount, it is said, to 1900 ships; the latter, to 918—with an aggregate number of 188,000 sailors. This force, however, is insufficient to extirpate or even keep in check the pirates who infest the whole coast of China, and the expedient was formerly resorted to of promoting a pirate chief to some high civil employment. Even yet he is sometimes appointed pilot. The Chinese are now building frigates on their own account—another evidence of the stride taken under the regency of Prince Kung.

Revenue.—The estimates of the public revenue of China vary greatly, and while they are stated by some to exceed 100 million sterling, are held by others not to come up to half that amount. Official returns of the Chinese government—intended for a special use—were published in 1844, according to which the revenue amounted to £63,934,713, derived mainly from three sources—customs duties, licenses, and a tax upon land.

Religion.—The Chinese, remarkable in so many ways, exhibit, in the matter of religion, their usual eccentricity Three forms of belief—the Confucian, the Budd-

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hist, and the Taouist—may be considered the national religions, as they are believed in, more or less, by the great mass of the people. Of these, the Confucian and the Taouist are indigenous, but Buddhism was introduced from India. A struggle for ascendency was long maintained between these religions, but has now entirely ceased; indeed, it is no unusual thing for all three to be professed by the same person, and as they supplement each other, this is not altogether inconsistent. Confucianism is the basis of the social life and political system of the Chinese. It has been professed by all their greatest men, and is still the sole belief of the educated classes. It is, however, less a religion than a philosophy, and does not pretend to treat of spiritual things; hence, room was left for other creeds to supply its deficiencies in this respect. The questions to which Confucius replied were: "How shall I do my duty to my neighbor? How can I best discharge the duty of a virtuous citizen?" Funereal temples are erected to Confucius, and though his image is not used as an idol, his tablet is worshipped, and sacrifices of oxen and sheep are offered before it at the vernal and autumnal equinoxes. For an account of Confucius's philosophy, see CONFUCIUS.

Buddhism in China, though extending over the whole country, and influencing more or less the mass of the people, is fast losing its hold on them, and has very little of the power and authority it once possessed. Its edifices are going to decay, and no new ones rise upon their ruins. Its priests are illiterate, and together with their religion, are held in contempt by the philosophic Chinaman. Aged people and women are now its chief devotees. The begging-monk wears a loose yellow robe and large stockings; at his back is a wallet in which to receive the contributions of the faithful; and he gives notice of his approach by striking his *muh-yu*. The northern form of Buddhism, which differs considerably from that of Ceylon and the Indo-Chinese Peninsula, prevails in China. Its sacred books, in common with those of Nepaul and Tibet, are written in Sanscrit, or are translations from that language. Amongst other additions to the creed are the Western Paradise and the Goddess of Mercy.

Taouism has not more hold than Buddhism on the literate Chinese. Its priests are generally ignorant men, few of them teaching or understanding the real principles of their faith. They practise a mystic alchemy, prepare spells and incantations, and, like modern spiritualists, hold intercourse with the dead. When all other remedies have failed with a sick person, the Taouist priests are sometimes sent for to exorcise the evil spirit that is supposed to afflict the patient; and they chant prayers from their mystic ritual, amid the din of gongs, drums, flutes, &c. These mystics worship certain stars, which are supposed to influence human life, and also genii, devils, and inferior spirits. They live in temples with their families, and are known by their slate-colored robes. For a fuller account of Taouism and its doctrines and founder, see LAO-TSE.

Besides these three religions, which alone affect the bulk of the people, there is a *ritual state worship*, which regards the emperor and court alone—a kind of philosophic pantheism, an adoration of certain natural objects; but it is a mere ceremonial, and associated with no theological doctrines. Three classes of objects are distinguished, to which the great, medium, and lesser sacrifices are offered. The first class includes the heaven and the earth. Equal to these, and likewise restricted to the worship of the emperor, is the great Temple of Imperial Ancestors. The medium sacrifices are offered to the sun and moon, the gods of the land and grain, genii, and sages. In the third class are reckoned certain natural phenomena, as well as deceased statesmen and scholars. The emperor appears to acknowledge a Supreme Being as king of kings, the rewarder of virtue and the punisher of vice; but still, Chinese Philosophy, as fixed by Chu-tze, is atheistical, and deduces "the development of the universe from one unintelligent and will-less principle." Hence all educated Chinese are atheists, at least theoretically, as will be found by arguing with them; but when they speak of human affairs generally, and their own particular lot in life, they exhibit a belief in *Tien* as a supreme, intelligent, rewarding and punishing power.

Between the followers of the three national religions, there is not only a total absence of persecution and bitter feeling, but a very great indifference as to which of them a man may belong. It arises probably from religious apathy; yet still it is preferable to the fanatical zeal and cut-throat earnestness of the Moslem. Amongst

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the politer classes, when strangers meet, the question is asked: "To what sublime religion do you belong?" and each one pronounces a eulogium, not on his own religion, but on that professed by the others, and concludes with the oft-repeated formula: "Religions are many; reason is one; we are all brothers." The government is equally tolerant of religious diversity, except where a political design is suspected.

Temples belonging to the three religions are very numerous. Those dedicated to Confucius are funereal in character. The Buddhist temples are crowded with images, and Buddha is represented expounding his doctrine to attentive listeners. The many-storied tower takes the place of the bell-shaped dagoba or relic-shrine of other Buddhist countries.

History and British Intercourse.—The early annals of China, like that of most other countries, belong rather to mythology than to history. Beginning with Panku, the first of all beings, the country was ruled over first by gods, and then god-descended personages, who revealed to men the essential arts of life. Of those mythical rulers the most famous is Fo-hi. The historical period may be said to commence with the Hia period or dynasty, begun by Yu the Great about 2200 B.C., although a great infusion of the fabulous still continues. Some date the real history of China from the Tchow or Chow dynasty, which began with Wu-wang about 1100 B.C. It was during the reign of Ling-wang (571—544), one of this dynasty, that Confucius was born. China would seem during this period to have been divided into a number of independent states. The kings of Tsin gradually gained the ascendency, and at last one of them reduced the other states to subjection (247 B.C.), and assumed the title of Hoang, or emperor. It is from the Tsin dynasty that the country has taken its name, Tsina or China. This first emperor finished the Great Wall, as a protection against the Tartars, who had all along, under the name of Hiong-nu (Huns), been a source of danger and annoyance to the richer and more pacific Chinese. We cannot enumerate the various dynasties that followed, nor the frequent divisions and reunions of the empire, varied by incursions and partial subjugations by the troublesome Tartars. At last, the Mongols or Western Tartars, being called in to aid the Chinese (1209), became finally (see KUBLAI KHAN) masters of the whole country (1279), and reigned over it till 1368, when they were expelled by the Chinese, and the Ming native dynasty succeeded, which lasted 276 years, and fell at length through its own misgovernment. A general of the last Ming emperor, who was employed in keeping the Mantchus (q. v.) in check, made peace with them, and obtained their assistance against the native usurper who had deposed his sovereign. The Mantchus established themselves in Pekin (1644), and finally, after a seven-years' struggle, acquired the sovereignty of the whole empire. Many of the conquering race now filled the highest offices of state, and owed their position to birth alone. More than one powerful emperor of the race has ably conducted the government of the country; but Hien Fung, who ruled from 1850 to 1861, was reported to have passed his time in a state of drunken imbecility. The late emperor, Tung-chi, succeeded to the throne when only a child five years old, but the government was ably carried on under the co-regency of the empress-dowager, Tze-an, the empress-mother, Tzo-asse, and the enlightened Prince Kung, brother of Hien Fung Tsai-Tien, cousin of Tung-chi, ascended the throne in 1875. As he was then only about four years old, the empresses continued to act as regents.

Of recent events in Chinese history, the most remarkable is the rise, progress, and overthrow of the Tae-ping rebels. Their famous leader, Hung-sew-tsenen, was a man of humble origin, and an unsuccessful candidate for government employment. Some Christian tracts, it is said, led him to renounce idolatry, and he founded a society of God-worshippers, which, in the autumn of 1850, was brought into collision with the imperial authorities, and immediately assumed a political character. Hung persuaded himself and his followers that he had received a divine commission to uproot idolatry, extirpate the Tartar intruders in the country, and establish the new native dynasty of Tae-ping, or Universal Peace. He assumed the title of Heavenly or Divine Prince (Tae-ping-wang, sometimes called Tien-wang), and bestowed the titles of Eastern Prince, Western Prince, Southern Prince, Northern Prince, and Assistant Prince on five of his chosen leaders. The fanatical principle of divine revelations and other extravagances followed. They spoke of Tien-ma, the wife of the Heavenly Father; they held that Tien-wang was the son

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of God as really as Jesus, and worshipped him accordingly. Polygamy was a dark feature of their system, the Tien-wang himself having married 80 wives. The course of this religio-political rebellion, the victorious march of the Tae-ping army from Kwang-se to Nankin in 1850—1853, and its subsequent career, cannot here be traced. We can only afford room to state, that after a series of wasteful and revolting barbarities, it was finally suppressed in 1865 by the imperial troops, led by British and American officers, of whom the most conspicuous and able was Colonel Gordon. See TAE-PINGS.

In early times, the Chinese do not appear to have been opposed to intercourse with foreigners: but the conduct of the Spaniards and Portuguese between 1520 and 1570 excited their hostility. The Mantchu government restricted British trade and intercourse to Canton, where it was carried on through the medium of the *hong* merchants on the one side, and the East India Company on the other. Differences arose, however, from time to time between these two commercial bodies, occasioned chiefly by the exactions of the mandarins on foreign trade. With a view to a better understanding, the British government despatched to Pekin an embassy under Lord Macartney in 1792, and another under Lord Amherst in 1816. On the 22d April 1834, the monopoly of the East India Company ceased, and British Imperial officers were appointed to carry out the new judicial and fiscal arrangements. Constant dissensions between these and the mandarins continued till the end of the year 1839, when the latter, under pretence of stopping the opium-trade, committed acts of open hostility. A war broke out the following year, at the commencement of which Chinese officials talked of invading England overland, by way of Russia. The imperial government was, however, sufficiently humbled by the middle of the year 1842, and on the 29th August, a treaty of peace was signed before Nankin, by which the ports of Amoy, Fu-chow, Ning-po, and Shang-hae were, in addition to Canton, thrown open to foreign trade. The other most important articles of the treaty provided that the island of Hong-kong should be ceded in perpetuity to her Britannic Majesty, her heirs and successors, and that the emperor of China should pay 21,000,000 dollars towards the expenses of the war.

With five free ports, British trade with China soon assumed gigantic proportions; and though the Chinese evaded the treaty whenever practicable, no important event occurred to interrupt commercial intercourse till 8th October, 1856, when the authorities at Canton seized the crew of the lorcha *Arrow*, a vessel registered at Hong-Kong, and entitled, it was considered, to British protection. Under pressure from the British forces at hand, the imperial commissioner, Yeh, delivered up the men, but refused all apology. Yeh continuing obstinate, Canton was stormed (December 28, 1857) by the allied French and English forces, and the Chinese imperial commissioner captured January 5, 1858). The government of the city was still carried on by Chinese officials, but under the authority of the plenipotentiaries and commander-in-chief. The former now proceeded to the north of China, to put themselves in more direct communication with the imperial government, which still continued obstinate. The forts at the mouth of the Peiho were taken (May 20, 1858), and at length an important treaty was signed at Tien-tsin, June 26, 1858, which stipulates that the queen of Great Britain may (Art. ii.) appoint diplomatic agents to the court of Pekin, who (Art. iii.) shall be allowed to reside at the capital, where also her Majesty may acquire a building site. The Christian religion (Art. viii.) shall be protected by the Chinese authorities. British subjects (Art. ix.) shall be allowed to travel for pleasure or business to all parts of the interior, under passports issued by their consul. British merchant-ships shall trade (Art. x.) upon the Great River (Yang-tze); but as its lower valley is disturbed by outlaws, no port except Chin-keang shall be opened for the present. Chin-keang to be opened in a year from the date of the signing of the treaty.

By this treaty the vexed question of transit dues is settled, it being agreed that the British merchant may purchase at the rate of 2½ per cent. *ad valorem* in the case of imports at the port of entry; and in the case of exports, he may purchase a certificate enabling him to pass his goods, duty free, to the port of shipment. By a separate clause the Chinese government agreed to pay two million taels (about £650,000) as indemnity for losses sustained by British subjects at Canton, and a like sum towards the expenses of the war.

The repulse on the Peiho (June 1859), by a Tartar force concealed in the Taku

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forts, of the expedition forming the escort of the British and French ambassadors, who were on their way to Pekin to ratify with the emperor of China the treaty of Tien-tsin, entailed another costly demonstration in the Chinese waters. The Taku forts were captured by the allied English and French forces August 21, 1860, and Pekin itself in December 1860. The treaty of Tien-tsin was ratified, two additional articles being inserted, one of which legalised coolie emigration. Since 1861 a gradual but beneficial change has come over the spirit of the Chinese government. Prince Kung proved a vigorous and successful regent. The army has been reorganized, and is now subjected to European drill (see par. *Army*); a respect for the observance of treaties has sprung up; a national flag has been adopted, and a desire shewn on the part of the Chinese to make themselves acquainted with international law. In 1866 arrangements were begun for telegraphic communication between Pekin and the rest of the world, and emigration to all other countries was allowed. Shanghai has telegraphic communication with Europe and some local lines, and the first Chinese railway was opened there in 1876. Chinese are now found on almost every shore of the Pacific, where their industry, skill and sobriety, secure them abundant employment.

Commerce.—The rivers and numberless canals of China are covered with vessels of all sizes, employed in the internal commerce of the country, which consists chiefly in the exchange of the various products of the several provinces. The Chinese are devoted to traffic, and the Middle Kingdom is throughout its length and breadth a perpetual fair. The total value of the imports into China in 1876 is given at £23,423,120 by the "Almanach de Gotha," and of the exports, £26,950,170. Tea and silk are the great staple export from China. The statistics of British trade with China in 1865 and 1874 are as follows:

Years.	Exports from China to Great Britain.	Imports of British Home Produce into China.
1865	£10,677,995	£3,603,595
1866	10,846 388	5,090,074
1867	9,340,402	4,996,469
1868	11,217,450	6,312,175
1869	9,621,358	6,842,840
1870	9,481,737	6,139,683
1871	11,830,388	6,628,236
1872	13,246,042	6,694,511
1873	12,454,234	4,889,701
1874	11,145,909	4,751,103

There is no *coinage* in China except the copper *tchen*, or "cash," which is in value about the tenth of a halfpenny; and all but the most trifling payments are made by a certain weight of silver, or in Mexican or Spanish dollars. Chinese accounts are kept in taels, mace, candareens, and cash. A tael is worth 6s. 8d., British currency.

The following works (which have been used as authorities in the preparation of this article) may be consulted for further information on China: Meadows's "Chinese and their Rebellions" (Lond. 1856); Davis's (Sir J. F.) "China: a General Description of that Empire" (Lond. 1857); Davis's "China during the War and since the Peace" (Lond. 1852); Williams's "Middle Kingdom" (New York and Lond. 1848); Oliphant's "Narrative of the Earl of Elgin's Mission to China and Japan in the years 1857, 1858, and 1859" (Edin. 1859); Marquis de Moges's "Recollections of Baron Gros's Embassy to China and Japan in 1857 and 1858" (Lond. 1860); Huc's "Chinese Empire" (Lond. 1858); Cooke's "China in 1857 and 1858;" Fortune's "Three Years' Wanderings in China" (Lond. 1847); Fortune's "Visit to the Tea Districts of China" (Lond. 1852); Edkin's "Religious Condition of the Chinese" (1858); Cobbold's "Pictures of the Chinese by Themselves" (1859); "Twelve Years in China, by a British Resident" (1860); "Memoires sur la Chine" (1869); Rev. A. Williamson's "Journeys in North China, &c." (1870); also Dr Gray's "China: a History of the Laws, Manners, and Opinions of the People" (1878); and the Freiherr von Richthofen's great work, "China" (1st vol. 1877).

CHINESE EDIBLE DOG. The kind of a dog used as an article of food in China, and reared in order to be so used, being esteemed as a delicacy, is a small dog of greyhound-like form, with somewhat terrier-like head, and muzzle more elonga-

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ted than in terriers. It is fleet and active, gentle and affectionate. The skin is almost destitute of hair; but there is a variety having a crest of long hair on the head, and a large tuft of hair at the tip of the slender and otherwise naked tail.

CHINESE HEMP. See CORCHORUS.

CHINESE INK. See INDIAN INK.

CHINESE LANGUAGE, WRITING, AND LITERATURE. The Chinese language belongs to those Asiatic languages commonly called monosyllabic, because each word is uttered by a single movement of the organs of speech, and expresses in itself a complete idea or thing. All Chinese words end either in a vowel, a diphthong (in which, however, each vowel sound is distinctly pronounced, making the word often to appear of more than one syllable), or a nasal. Of such simple words or roots there are about 450. But the emphasis or accent of many of these words may be varied by the speaker in four or five different ways, so as to produce a corresponding variety in their meaning, by which means the number of simple words or roots amounts to about 1200. There is no distinction of parts of speech in the Chinese language, and no recognition of the principle of inflection, Chinese words being incapable of any modification of *form*. The relations of words are ascertained by their position in a sentence. Hence Chinese grammar is *solely* syntax. Thus *ta*, according to its position in a sentence, at one time serves the purpose of an adjective, meaning "great;" at another, a substantive, meaning "greatness;" and again of a verb, meaning "to enlarge" and "to be great," or of the adverb "very." There are certain words, however, which have at length lapsed into so vague and general a signification, that in conversation and literature they are now used in some cases as particles to determine the relations of other words; but in the older literature this is very rare, and is against the genius of the language. From what has been said, it will readily be inferred that the gender, number, and case of words are not determined by the *form* of the words themselves. They are, in fact, denoted by the addition of other words. Thus, *people* in Chinese is *multitude man*, *son* is *man child*, *daughter* is *woman child*. *The best of men* is in Chinese *a hundred man good*. The purest Chinese is spoken at Nankin, but the same idiom, called "the language of the mandarins," is spoken by the educated in all parts of the empire. For a knowledge of Chinese grammar, see Schott's "Chinesische Sprachlehre" (Berlin, 1857); Summer's "Handbook of the Chinese Language" (1863); Julien, "Syntaxe Nouvelle de la Langue Chinoise" (Paris, 1880); Morrison's "Dictionary of the Chinese Language" (Shanghae, 1865).

In Chinese the written character, generally speaking, does not indicate the sound of the word, but gives a kind of hieroglyphic or pictorial representation of the idea or thing to be expressed. Hence there are required as many of these characters or symbols as there are ideas to be represented. Since many words similar in sound are different in signification, whilst in writing each idea has its peculiar symbol, the number of words represented by writing—without reckoning those peculiar to certain dialects—is perhaps ten times greater than those distinguished by the ear. The number, in fact, is reckoned at 50,000, but these are far from being all in general use. In writing, and printing, the characters are arranged in perpendicular columns, which follow one another from right to left.

In its origin, Chinese writing is hieroglyphic or picture-writing, with the addition of a limited number of symbolical and conventional signs; the larger number of Chinese characters are formed by the combination of such hieroglyphs and signs. But as one such character by itself seldom determines the sound, an additional word is conjoined for this purpose; so that the great mass of Chinese written words consists of an ideographic and a phonetic element. Native grammarians divide their characters into six classes. The first class comprises simple pictorial representations of sensible objects, such as sun, moon, mountain, &c., and contains 608 characters. The second class includes such characters as are formed by the combination of two or more simple hieroglyphs, which together convey in a more or less intelligible manner, some other idea: for example, the hieroglyph for sun, combined with that for moon, conveys the idea of light; mouth and bird, that of song, etc.; of these there are 740. The third class embraces these characters which indicate certain relations of position, as above, below, the numerals, etc.; of these there are 107. The fourth class consists of characters, which, by being inverted, acquire an opposite signification, as

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right, left, standing, lying, etc., and contains 872. The characters of the fifth class are termed derived characters; the meaning of the simple or compound characters used to express physical objects, is transferred to mental objects, or to other physical objects with which they are associated, e. g., the hieroglyph for a heart signifies the soul—that for a room signifies the wife, etc.; of these there are 598. The characters of the sixth class include those which are composed, as above mentioned, of sign and sound. Almost all names of plants, fishes, birds, and many other objects which it would be difficult to represent hieroglyphically, are denoted by the compound characters of the sixth class, which amount to 21,810 in number. As this class, however, consists merely of repetitions of the other five classes, the immense number of Chinese characters may be reduced to 2425; and whoever learns these may be said to know them all.

The hieroglyphical characters in their oldest form were easily recognisable figures, such as a circle with a dot in the centre for the sun; a new-moon shape for the moon; for light, a combination of sun and moon; for to listen, folding doors and an ear; for white, a very squint eye, in which hardly anything but the white is seen; for friends, the two valves of a bivalve shell. In the course of time, through hasty and careless tracing, the objects denoted by the hieroglyphs have almost ceased to be recognisable. See Abel Rémusat's "Mémoire sur l'Écriture Chinoise," in the "Mémoires de l'Académie des Inscriptions," vol. iii; and for a view of the Chinese characters, both ancient and modern, Hager's 'Monument de Yü (Bar. 1802).

The Chinese literature, in a geographical, ethnographical, and historical point of view, is unquestionably the most comprehensive and important of the whole of Asia. The printed catalogue of the Emperor Kien-long's library is composed of 122 volumes; and a selection of the Chinese classics, with commentaries and scholia, which was begun by the order of the same emperor, is said to comprise 180,000 volumes, of which, in the year 1818, 78,731 volumes had already appeared. In the five canonical or classical books, called "King," are contained the oldest monuments of Chinese poetry, history, philosophy, and jurisprudence, some portions of which belong, perhaps, to the most ancient writings of the human race. Confucius (q. v.), in the 6th c. B.C., collected them from various sources, and in this collection they have been pretty faithfully handed down to us. Next to these in value are the "Sse-shu," or the four books. These as they were written by Confucius and his disciples, must be regarded as the most trustworthy source of insight into the intellectual and political life of the Chinese. A complete and elaborate edition of the five "King" and the four "Shoo" has been undertaken by our great English Sinologue, Dr Legge, under the title of the "Chinese Classics, with a translation, critical and exegetical notes, prolegomena, and copious indexes, in seven volumes;" of which five vols. appeared between 1861 and 1878. A popular edition, under the title of "The Chinese Classics translated into English," has also been published, of which vols. i. and ii. deal respectively with the "Life and Teachings of Confucius" and the "Works of Mencius." Almost contemporary with Confucius lived Lao-tse (q. v.), who was born 604 B.C. He was the founder of a school of philosophy, more spiritual in its character than that of Confucius, but which has now degenerated into the lowest and most vulgar kind of demonology; see "Le Livre de la voie de la Vertu," Chinese and French, by Julien (Par. 1842). In mythology, the Chinese have "The Book of the Mountains and Seas," "The History of the Gods and Spirits," and some others. In jurisprudence may be mentioned the universal collection of laws, and the criminal code of the present dynasty; see "Ta-Tsing-lu-li, being the Fundamental Laws and Supplementary Statutes of the Penal Code of China," by Staunton (Lond. 1810). The Chinese literature is also very rich in works on medicine, natural history, astronomy, agriculture, military science, music, and all branches of mechanics and industry; see "Résumé des principaux Traités Chinois, sur la Culture des Mûriers et l'Éducation des Vers-à-soie," by Julien (Par. 1837). In philology, the most valuable works are the dictionaries, in which the Chinese characters have been collected and elucidated by examples from the whole treasury of Chinese literature; but the greatest of all works of this kind is the dictionary of the Emperor Kang-hi, which is now regarded as the highest authority for the pronunciation and meaning of the characters. Of the encyclopædias of the Chinese, the most conspicuous are that by Ma-tuan-lin

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(1300 A.D.) called "Wen-hien-thong-khao—i. e., an accurate investigation of the ancient documents, with rich supplements; and the "Koo-kin-koo-shoo-tsei-ching," or "Complete Collection of Ancient and Modern Books"—of which latter vast work a copy was secured for the British Museum in 1877. But the most valuable portions of the Chinese literature are, undoubtedly, their historical and geographical works, which are indispensable to a knowledge of Upper Asia. See-ma-thsian (100 B.C.) compiled, from every recognised authority, a work called "See-ki," or historical memorials, which embraces the history of China from the year 2637 B.C. up to the commencement of the dynasty of Han in the 2d c. B.C. This work has been continued by the different dynasties, and forms a complete collection of the annals of the empire up to the termination of the Ming dynasty in 1643 A.D. It is known under the title of "Nian-eul-see," or the 22 histories. The entire collection of the official annals from 2698 B.C. to 1645 A.D., comprising a period of 4343 years, and consisting of 3706 books, is to be found in the library at Munich.

Amid all their scientific labors, the Chinese have not neglected the art of poetry, in which they possess voluminous collections that have yet to be made known to Europe. In lyrical poetry, the most distinguished names are Li-thai-pe and Tu-su, both of whom flourished at the beginning of the 8th c. A.D.; see Davis "On the Poetry of the Chinese," in the "Transactions of the Royal Asiatic Society," vol. ii. The romantic poetry of the Chinese, although void of poetic beauty, is valuable for the insight it gives into their domestic life. Their dramatic poetry has laws peculiar to itself, and resembles partly the romantic drama of the Germans, and partly the *comedia delle arte* of the Italians. They have also a kind of novel in dialogues, which forms a subordinate species of drama. Besides the speaking persons or actors, there is what they call a singing person, who introduces into the piece songs which he sings to popular melodies, and appears to correspond in a rude way to the Greek chorus. The best collection of works in this species of literature is the "Yuen-dschin-pe-tschong," i.e., the hundred dramas from the Mongol dynasty (1260—1341), from which all the Chinese dramas known to Europeans have been taken. A Chinese novel affording a graphic view of the tastes and literary views of that people, was some time ago placed within the reach of European readers by the eminent Chinese scholar Stanislas Julien, under the title of "Les Deux Jeunes Filles Lettrées (Par. 1860). English readers may also obtain instructive pictures of Chinese life from "Iu-kiao-li," or the Two Fair Cousins, translated from the French version of Remusat in 1827; and "The Flowery Scroll," translated, with numerous learned notes, by Sir John Bowring, in 1868. But valuable sketches will be found in Schott's "Chinesische Sprachlehre" (1857), Davis's "Chinese Miscellanies" (1865), and "Wylie's Notes on Chinese Literature" (Shanghai, 1867).

CHINESE SEA, or China Sea, that portion of the Pacific Ocean which has China or Siam on the west, the island of Formosa on the north, the Phillippines on the east, and Borneo on the south, and which forms the great Gulfs of Tonquin and Siam.

CHINESE WHITE. The white oxide of zinc has recently been introduced into the arts, under this name, as a pigment in place of the preparations of white-lead. It changes very little either by atmospheric action, or by mixture with other pigments; but it has not the body of white-lead.

CHINGLEPU'T.—1. Afort, with a town adjacent, in lat. 12° 41' n., and long. 80° 2' e., 36 miles to the south-west of Madras. It is accessible to an enemy only from the south, having a tank or artificial lake on the east and part of the north, and rice-fields, irrigated from the same, on the remainder of the north and on the west. In the dry season, the tank is nearly exhausted, the weeds and slime in its bed causing malaria. Notwithstanding this, however, the place is considered to be more than ordinarily healthy. Pop. of town (officially spelt *Chengalpat*) in 1071, 7979.—2. A district taking its name from the town above mentioned. It stretches in n. lat. from 12° 14' to 14°, and in e. long. from 79° 35' to 80° 25', and contains 2753 square miles. Pop. (1871) 938,184. With about 120 miles of coast, it has not a single harbor or anything like shelter from the surf. Nor is its internal navigation of any value. The only considerable river, the Palar, is in most parts destitute of water during the dry season. Excepting in October, November, and December, comparatively little rain falls. From that circumstance, and perhaps also from an inferiority of soil,

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cultivation is said to be so much circumscribed, as to embrace only about 96,000 acres, or 1-20th part of the entire area.

CHINI', a village of the Punjab, about a mile from the right bank of the Sutlej, the most easterly of the five rivers which give name to the country. It is in lat. 31° 31' n., and long. 78° 19' e., and is 8770 feet above the sea. Notwithstanding this elevation, it is a delightful place of sojourn, and was a favorite residence of Lord Dalhousie. It occupies a slight depression on the southern slope of a lofty mountain, which fertilises the soil with a net-work of never-failing rills. The neighborhood is remarkable for the size and and flavor of its grapes, while the vines, trained over horizontal lattices, afford, while in foliage, a tolerably continuous shelter.

CHIN-KEANG-FOO ("River-Guard City"), a Chinese city and port on the Yang tze-kiang, at the junction of the Grand Canal with that river, and about 150 miles from its mouth, was opened to European commerce by the treaty of Tien-tsin (1858), and a British settlement was begun in 1864; but trade is very slowly developing, and there is reason to doubt if C. will ever become a place of importance. The anchorage is bad, the port is not a natural outlet for any staple of exportation produced in the neighboring country, and it possesses no advantage as regards the introduction of foreign goods. Formerly, however, as the southern key of the Grand Canal, it was both an important stronghold and a centre of traffic. The injury which the Grand Canal has sustained has for the present practically extinguished the inland trade, and the four years (1853—1857) during which it was in the barbarous hands of the Tae-pings are said to have reduced the population from half a million to 500.

CHINNOR, a musical instrument of the ancient Hebrews, with 32 strings.

CHINON, a town of France, in the department of Indre-et-Loire, beautifully situated on the Vienne, 25 m. s. w. of Tours. It has the remains of a huge old castle, formerly the occasional residence of the Plantagenet kings of England, and also of some of the French sovereigns, and celebrated as the place where Joan of Arc commenced her historical career, and as the birthplace of Rabelais. C. has manufactures of druggets, serges, earthenware, &c. Pop. (1872) 4625.

CHI'NQUAPIN. See CHESTNUT and OAK.

CHINSU'RA, a town on the right bank of the Hooghly, about 20 miles above Calcutta, in lat. 22° 53' n., long. 88° 28' e. Pop., along with Hooghly (1871) 34,761. It contains the Hooghly College, and is considered one of the healthiest places in Bengal. It was originally a Dutch settlement, but was ceded in 1824 to the British, along with some other places on the mainland, in exchange for the English possessions in the island of Sumatra.

CHINTZ, a highly glazed printed calico, with a pattern in many colors on a white or light-colored ground. It is chiefly used for bed-hangings, for covering furniture, and other purposes where gay colors are desired, and where there is much exposure to dust, which does not adhere to its highly calendered surface.

CHI'O. See SCIO.

CHIOCO'CCA, a genus of tropical and sub-tropical plants, of the natural order *Cinchonaceæ*, of which two species in particular, *C. anguifuga* and *C. densifolia*, the former a trailing herb, the latter a bushy shrub, enjoy a high reputation in their native country, Brazil, as cures for snake-bites. An infusion of the bark of the root is certainly one of the most violent emetic and drastic medicines known, its action being accompanied with spasmodic agitations of the whole frame and other symptoms, such as to preclude its use except in the most extreme cases. Yet it had at one time a high reputation in Europe, and was administered in small doses as a diuretic and purgative.

CHIO'GGIA, or Chio'zza, an important commercial town and seaport of Northern Italy in the province of Venice, stands on an island of the same name in the Adriatic, and is connected with the mainland by a stone bridge of 43 arches. The population, amounting to (1872) 26,336, are chiefly engaged in the coasting-trade, in lace-making, and in ship-building.

CHIO'NIS and Chio'nidæ. See SHEATH-BILL.

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CHIP HATS. See BRAZILIAN GRASS.

CHI'PPENHAM, a parliamentary and municipal borough in Wiltshire, in a valley on the left bank of the upper part of the Bristol Avon, on the Great Western Railway, 22 miles east of Bristol. It consists chiefly of a well built street above half a mile long. A bridge of 21 arches crosses the Avon here. C. is famed for its markets of cheese and corn, its cheese market being one of the largest in Britain. There are silk and woollen manufactures; and some mineral springs in the vicinity. Population of parliamentary borough (1871), 6875; of municipal, 1387. It returns one member to parliament. C. was the seat of the Saxon kings of Wessex. About 880 the Danes took it from Alfred, and kept it two years.

CHI'PPEWAYS. See INDIANS.

CHIQUICHIQUI PALM (*Leopoldinia Piassaba*), the PIASSABA of the north of Brazil, and one of the palms which yield the Piassaba (q. v.) fibre now so much used for making brushes. The Piassaba fibre exported from Pará is all obtained from it. It grows in swampy or occasionally flooded lands on the banks of the Rio Negro and other rivers of Venezuela and the north of Brazil; and has a crown of very large, regularly pinnate leaves, with smooth slender stalks. The leaves, like those of many other palms, are much used for thatching. The commercial fibre is obtained from a remarkable covering of the stem; formed of marginal processes of the leaf-stalks, elongated into ribbon-like stripe, and interlaced, finally splitting into fine fibres, hanging down five or six feet, and entirely concealing the stem, so as to give the tree a very extraordinary appearance. It twists readily into cordage, and the fibre has been long used for cables of canoes on the Amazon and other rivers. Before the independence of Brazil, the Portuguese government had a factory on the Rio Negro for the manufacture of cables of this fibre. The export of the unmanufactured fibre from Pará to England began about the middle of the present century.

CHIQUIMU'LA. Isthmus of, in Central America, to the south-east of the peninsula of Yucatan, in long. 89° w. Its breadth from the Caribbean Sea to the Pacific is about 150 miles—the greatest elevation not exceeding 2,000 feet.

CHIRA'TA, Chire'tta, or Chiree'ta (*Agathotes Chirayta*, also known as *Ophelia Chirata*), an officinal plant belonging to the natural order *Gentianeæ*, and possessing properties similar to those of the common Gentian, the Centaury, and other plants of that order. It is a native of the mountains of the north of India. The whole plant is intensely bitter, and has long been used in its native country as a tonic and stomachic. It is also in high estimation with European practitioners in India as a febrifuge, and is often used by them as a substitute for cinchona. The medicinal virtues reside both in the herb and root. The whole plant is pulled up at the time when the flowers begin to fade, and is dried for use. It is now imported to some extent into Britain.

CHIRIQUI', a name of various application in Central America—1. A province on the isthmus and in the state of Panama, Colombia; area 500 sq. m.; pop. 18,000.—2. A river flowing towards the north—the lat. and long. of its mouth being about 9° n., and 82° 30' e.—3. A spacious lagoon with three entrances, and with a depth of water for the largest ships, which receives the river. It measures 90 m. along the coast, and 40 or 50 in width.—4 An archipelago between the lagoon and the Caribbean Sea.

CHI'RON, or Cherion, the most famous of the Centaurs (q. v.). In the ancient works of art, C. of course appears as half-man, half-animal; but his features, instead of expressing mere savage and sensual strength, as those of the Centaurs generally do, are marked by a mild wisdom, in harmony with the character and deep knowledge attributed to him by the Greek mythologists.

CHI'RRA POO'NJEE, a town in the north-east of India, in lat. 25° 14' n., long. 91° 45' e. It stands on the Cossya Hills, at the height of 4200 feet above the sea—and has a temperature during the hot months 20° F. lower than that of the plains of Bengal. Notwithstanding this, however, the place has proved unsuccessful as a sanatorium. The vicinity abounds in mines of coal and iron, which may be profitably worked.

CHI'RU (*Antilope Hodgsoni*), a species of antelope, inhabiting the pine-forests

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and elevated open plains of Tibet, in regions bordering on the limits of perpetual snow. It is much larger than the chamois, being about five feet in length, and the height at the shoulder about three feet. The C. lives in great herds, and seems to exceed almost all the other gregarious ruminants in watchfulness against the approach of danger. Sentinels are constantly posted, to prevent surprise.

CHI'SWICK, a village in the centre of Middlesex, 7½ miles south-west of St Paul's, London, on the left bank of the Thames. Pop. (1871) 8508. Around C. are many fine villas, extensive market-gardens, to supply London, and the gardens of the London Horticultural Society.

CHI'TIN forms the skeleton of all insects and crustaceans. In insects, it constitutes not merely the external skeleton, the scales &c., but also forms their tracheæ, and thus penetrates into the most remote portions of their organs; indeed, one of the layers of their intestinal canal consists of chitin. Hence we can make good preparations of these parts by treating insects with a solution of potash, which dissolves all but the C.: in this way, we can microscopically examine the most delicate parts, as, for instance, the valves of the tracheal openings.

In a state of purity, it is a white amorphous body, which usually retains the form of the tissue from which it is prepared. It has been analysed by C. Schmidt, Lehmann and other chemists. Schmidt considers that its composition is represented by the formula $C_{17}H_{14}NO_{11}$. The best method of obtaining C. is by boiling the elytra of the cock-chafer with water, alcohol, ether, acetic acid, and alkalies. The substance left after these respective boilings is pure chitin. It seems to be identical with the substance termed by Lassaigne *Entomaderm*.

CHI'TON, a Linnæan genus of molluscs. Linnæus, regarding merely the shell, placed them in the class of Multivalves, a class entirely artificial. They are now regarded as constituting a family (*Chitonidæ*) of gasteropodous molluscs, of the order *Cyclobranchiata* of Cuvier, and as occupying a place in systematic arrangement close to limpets. The shell is composed of eight narrow, transverse, calcareous pieces, overlapping each other in a row along the back, and strongly attached to the mantle, which is remarkably fleshy and fibrous. They have the power of rolling themselves up into a ball. The organ of locomotion is an oval foot, more or less wide, according to the species, and extending the whole length of the animal. More than 200 species are known; they occur in all climates, most abundantly on rocks at low-water, but some of them at great depths. Some of them creep along the sand. All the British species are small; but some foreign ones grow to three or four inches in length. The fry of these molluscs swim about by means of long vibratile cilia.

CHITTAGO'NG, or Islamaba'd (the second name having been conferred by Aurungzebe, who captured it towards the close of the 17th c.), a city of India, standing on the Kurrumfuli, about 7 miles from its mouth, in lat. 22° 20′ n., and long. 91° 54′ e. It came into the possession of the British, along with Bengal Proper, in 1760—1765. But having originally formed part of Arracan, it was claimed, after a lapse of sixty years, by the Burmese emperor as a dependency of that territory—a claim which formed one of the grounds of the war of 1824. Through the results of that contest, C. diminished in importance, but some European merchants began to settle there in 1864, and its prosperity is returning. In 1873 it exported 104,565 tons of rice. Its ship-building business is now transferred in great measure to Moulmein, in Tenasserim. Pop. (1871) 20,604.

CHITTAGONG, a maritime district in Lower Bengal, taking its name from its capital above mentioned. It is bounded on the s. by Arracan, and on the w. by the Bay of Bengal, and stretches from lat. 20° 45′ to 23° 25′ n., and from long. 91° 32′ to 93° e. It has an area of 2498 sq. m., with a pop. (1871) of 1,127,402. C. (properly *Chattagrâm*) also gives name to a *division*; area, 13,692 sq. m.; pop. 3,444,874. In the forests of C., large numbers of elephants are annually caught.

CHI'TTAGONG WOOD, the wood of *Chickrassia tabularis*, a tree of the natural order *Cedrelaceæ*, a native of the mountainous countries to the east of Bengal. In some parts of India, it is called *Cedar* or *Bastard Cedar*, names, however, which are also given to other kinds of wood. C. W. is much valued in India, and is used for all purposes for which mahogany is used in Britain. It makes beautiful and light

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furniture, but is apt to warp in very dry weather. Beautifully veined and mottled pieces are occasionally met with, and are highly valued.

CHITTO'R, the name of two fortified towns in India.—1. C. in the district of Arcot, about 80 miles to the west of Madras, in lat 13° 12′ n., and long. 79° 9′ e. It stands on the south or right bank of the Puni, an affluent of the Palar, and is about 1100 feet above the sea. Its river varies, according to the season, from a small rivulet to an expanse of 400 yards in width. When the stream is at its lowest, the very tanks, as well as the deserted channel, become little better than slime—the result being fever, ague, dysentery, and other diseases. The thermometer has occasionally reached 140° in the sun; but the annual range in the shade runs from 56° to 100°.—2. C. in Odeypoor, or Mewar, about 270 miles to the south-west of Agra, in lat. 24° 52′ n., and long. 74° 41′ e. The fortress occupies the summit of an isolated rock of nearly 6000 yards in length, and of 1200 in breadth, which is scarped all round to a depth of 80 or 100 feet, about a fourth part of its entire altitude. Within the enclosure are several antique structures—such as temples, tanks, a palace, commemorative pillars, and an inner citadel.

CHIU'SA, La, a town of N. Italy, province of Cuneo, situated on the left bank of the Pesio, 8 miles s.e. of Coni. It has manufactures of silk and glass, and a population of 3000.

CHIU'SA, La, (so called from the ground having been originally *enclosed* as pasture-land for horses), a town of Sicily, in the province and 80 miles southwest of Palermo, on the slope of some hills. The town was built in 1820. Agates are found in the vicinity. Pop. 6840.

CHIU'SI, a town of Central Italy, province of Siena, 37 m. s. e. of Siena, with a population of 3000, stands on an eminence in the Val di Chiana, not far from the lake of the same name. In ancient times, under the name of *Clusium*, it was one of the twelve republics of Etruria, and the residence of Porsena (q.v.). When Italy was overrun by the barbarians, C. fell into decay, the whole valley was depopulated and became the pestilential pool described by Dante. Since the improvement of the course of the Chiana (q. v.), C. has begun to flourish again along with the whole district. But it is in connection with the discovery of Etruscan antiquities that C. is chiefly heard of. Within the last quarter of a century immense quantities of these remains have been found in the neighborhood in the grottos that served the ancient Etruscans as tombs. There are three museums in C. filled with them, and a great number are in the public gallery at Florence. They consist chiefly of sun-dried earthenware vases, black and partly covered with mythological figures. Excavations still continue to be made, but discoveries have become rarer of late years.

CHI'VALRY (Fr. *chevalerie*, from *chevalier*, a knight or horseman), the system of knighthood, together with the privileges, duties, and manners of knights. The social arrangement to which this term is applied seems first to have assumed the character of a positive institution during the 11th c.; but so far from being an invention of that period, it had its roots in the manners of the Germanic races, amongst whom it ultimately arose, at the earliest period at which they are historically traceable. In the description which Tacitus has given us of the manners of the Germans, we find the most unequivocal indications of the existence, not only of the general spirit, but, in a partially developed form, of many of the special arrangements of chivalry. But it was in connection with feudality that C. attained to its full proportions, and in many respects it must be regarded as the complement of that institution. See FEUDAL SYSTEM. Whilst feudality exhibits the political, in C. we see the moral and social side of the arrangements of medieval life. It was in the feudal mansions of the barons that the system was developed; and to the lay portion of the youth of the higher classes, the instruction which they there received in the usages of C. formed by far the most important part of education. In addition to the martial accomplishments, which corresponded to those of a modern cavalry-officer, they were instructed in the political relations which subsisted between the vassal and his lord, by which the whole body of society was then bound together; and in what might almost be called a system of ethics, strangely enough exhibiting unmistakable traces of the Stoic philosophy. The analogy between the severer virtues recommended to

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the special cultivation of their disciples by the followers of Zeno, and those inculcated on the novice in C., and practised by the knights of the middle ages, might be ascribed to other than historical causes, were it not that we are able to trace the connection between them with something approaching to certainty. If any one wishes to convince himself of the truth of our assertion, let him compare the last production of the intellectual life of antiquity with one of the earliest and most important of our own literature, the "Consolations of Philosophy" of Boethius with Chaucer's "Testament of Love." The resemblance is so close, that the latter work has, not without reason, been regarded as an imitation of the former; but the main features which distinguished them, and mark Chaucer's work as belonging to the modern world, are more instructive than even their similarity. The place which Philosophy, the celestial consoler, occupies in the work of Boethius, in that of Chaucer is supplied by *Love*—a being whom we must in nowise confound either with the heathen goddess, or, as some have done, with the divine love of the Christian religion. She is neither more nor less than the embodiment of an abstract idea which formed the central point of the whole system of C.; and her substitution for the Philosophy or Reason of Boethius is very characteristic of a state of society in which the affections and passions, rather than the intelligence, were the motive principles. The "Love" of Chaucer is a complete generalisation, altogether independent of individual object, and the consolation which she proffers to her votary is that of enlisting in his favor the special guardian, the "Margarite," who is supposed to watch over his individual fortunes. The "Margarite" seems to correspond to the chivalrous idea of the *Lady-love*, in its purest sense, when its reference to a person was by no means indispensable, but when it signified rather "the love of woman," the highest object of the knight's ambition. Under the protection of this guardian spirit, the lover is represented as altogether sheltered from the caprices of fortune, and in her name he has a dose of rather frigid comfort administered to him, greatly resembling that which Boethius receives at the hands of Philosophy. Such is the general idea of the book, and it is a noble idea, embracing the very essence of society as it existed then, and presenting a much deeper view of that singular institution C. than is usually to be met with in writers who have not been actually brought in contact with its influences. But to the two elements which we have mentioned as ingredients in the spiritual life of C., the Germanic traditions on the one hand, and those of classical antiquity on the other, a third falls to be mentioned, which was, perhaps, the most important of all—that of Christianity as represented by the church. The clergy were too fully aware of the importance of early impressions, not to seize on the imagination of the aspirant to C. at the all-important moment of his inauguration. The purifications, prayers, and vigils, the sacrament and the vows by which this solemn rite was accompanied, are detailed elsewhere (see KNIGHT, BANNERET, BATH, &c.); and their influence in casting a religious character over the whole institution of C., and occasionally in directing its energies specially to the propagation of Christianity, by means of the various religious orders of knighthood and the Crusades, is well known. Nor was the poet behind the priest in availing himself of the influences of C. and developing them in the region of the imagination. What Chaucer has exhibited in the work to which we have referred, may be regarded rather as the philosophical than the poetical side of the institution. But to poets of a lighter and more imaginative cast of mind, C. has furnished, from the days of the troubadours down to the present poet-laureate, no insignificant portion of their subject-matter. King Arthur and his Knights of the Round Table, the traditions regarding whom had been taken from a period altogether mythical, and long anterior to the existence of C. as an institution, became to the poetry of the middle ages very much what the heroes of the Trojan War were to that of the whole ancient world. Much astonishment has often been expressed at the contrast between the lofty and ideal purity of the code of morals inculcated by C., and the grossness of the lives of the men who were trained under its influences. The case is one which in a remarkable degree proves the practical importance of the inculcation of sound doctrine, for the practice gradually, though slowly, conformed itself to the principles and it is probably in no insignificant degree to the elevated tone of the latter that we owe the moral superiority of the modern over the ancient world.

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CHI'VALRY, Court of, a military court, established by Edward III., of which the Earl Marshal and the Lord High Constable were joint judges. When held before the Earl Marshal alone, it was merely a court of honor; but when both were present, it was also a criminal court. Having encroached on the common law, its jurisdiction was defined by 13 Rich. II. stat. i. Under this act, the court claimed power to give relief to such of the nobility and gentry as think themselves aggrieved in matters of honor, and to keep up the distinctions or degrees and quality. In criminal cases, a jury was sworn; but in general the proceedings of the court were summary matters, being brought under its cognizance by complaint or petition. An attempt was made to revive the functions of the court in Queen Anne's time; but, except as represented by the Earl Marshal's court (see COLLEGE OF ARMS), it has now gone into abeyance.

CHIVA'SSO, a small city of Piedmont, Northern Italy, situated in a fertile plain on the left bank of the Po, about 15 miles north-east of Turin. It was formerly a place of considerable military importance, but its fortifications were destroyed in 1804 by the French. The lampreys of C. are celebrated throughout Piedmont. It has manufactures of bricks, earthenware, soap, &c., and a trade in the agricultural produce of the district. Pop. 4800.

CHIVE, or Cive (*Allium schæno'prasum*), a plant of the same genus with the leek and onion (see ALLIUM), a perennial, ½—1 foot in height, with very small, flat, clustered bulbs, increasing by its bulbs so as to form a sort of turf. The leaves are tubular, cylindrical-tapering, radical, nearly as long as the almost leafless flowering-stem, which is terminated by a hemispherical, many flowered, not bulbiferous umbel of bluish red, or, more rarely, flesh-colored flowers. The stamens are included within the perianth. This rather pretty little plant grows wild on the banks of rivers, and in marshy or occasionally flooded places in the middle latitudes of Europe and Asia. It is a rare native of Britain. In some of the mountainous districts of Europe a variety is found, larger and stronger in all its parts, and with flowering-stems more leafy. Chives—the name is generally used in the plural—are commonly cultivated in kitchen-gardens, often as an edging for plots, and are used for flavoring soups and dishes. Their properties are very similar to those of the onion. The part used is the young leaves, which bear repeated cuttings in the season.

CHIZEROTS and Burins form one of those peculiar races in France that live isolated in the midst of the rest of the population, and are despised and hated by their neighbors. They live in the arrondissement of the Bourg-en-Bresse, in the department of Ain; and the communes of Sermoyer, Arbigny, Boz, and Ozan belong to them. According to tradition, they are descended from the Saracens. Although industrious and prosperous, they are held in the utmost contempt and detestation by their peasant neighbors, who are often indolent and destitute. They are looked upon as covetous and malicious, and scarcely would the daughter of a small farmer, or well-to-do day-laborer, become the wife of one of them, so that they mostly marry among themselves. From time immemorial, the C. and B. have been field-laborers, cattle-dealers, butchers, &c. Many of them are very good-looking. The young women are handsome, clear-complexioned, with large black eyes. See Michel, "Historie des Races Maudites de la France et de l'Espagne" (2 vols. Par. 1847).

CHLADNI, Ernst Florens Friedrich, founder of the science of acoustics, was born at Wittenberg, November 30, 1756. He studied law in his native place, and also in Leipsic, where, in 1782, he was made Doctor of Laws. C. ultimately abandoned juridical studies altogether, devoted his mind to natural science, and, being but acquainted with music, was led to observe that the laws of sound were by no means so well established as those of other branches of physics. He therefore began to apply his knowledge of mathematics and physics to acoustics, and travelled for ten years (after 1802) through Germany, Holland, France, Italy, Russia, and Denmark, giving lectures on the subject, which were very successful. He died in Breslau, April 8, 1827.—C.'s writings include, "Discoveries concerning the Theory of Sound" (1787), "Acoustics" (1802), "New Contributions to Acoustics" (1817), and "Contributions to Practical Acoustics, with remarks on the making of Instruments" (1822). C. also wrote several essays on meteoric stones.

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CHLAMY'PHORUS, (Gr. chlamys-bearing; *chlamys*, a soldier's cloak), a very remarkable genus of mammalia of the order *Edentata*, ranked by naturalists in the same family with the armadillos, but differing in important respects from them, and from all other known quadrupeds. Only one species is known, *C. truncatus*, five or six inches long, a native of the interior of Chili, living underground like the mole, which it much resembles in its habits, and feeding on the same kind of food. Its fore-feet are adapted for digging, although in a different manner from those of the mole. The skull is destitute of sutures; there are resemblances to the osteology of birds in the ribs and their union to the sternum; the hinder part of the body is altogether unlike that of any other known animal, in its terminating quite abruptly, as if cut off almost where its thickness is greatest, or as if the back were suddenly bent down at right angles, the tail not springing from where the line of the back appears to terminate, but far below. The whole upper and hinder parts of the body are covered with a coat of mail, made up of a series of square plates; the under parts and legs are covered with long silky hair. The tail is very peculiar; it is covered with small scales, is expanded at the tip, and is usually incurved along the belly, but is furnished with such muscles as to suggest the probability of its being employed to throw back the earth in excavations.

CHLOPICKI, Joseph, a Polish general, and Dictator of Poland during the revolution of 1830, was born in Galicia in 1772. He entered the army in 1787, attracted the notice of Kosciusko during the first insurrection of the Poles, and after the storming of Praga, 9th November 1794, when the hopes of the patriots were extinguished for awhile, he passed into the service of the new Cisalpine Republic, and distinguished himself in various battles. In 1806 when Bonaparte called the Poles to arms, C., among others, obeyed, and fought gallantly at Eylau and Friedland. He was subsequently sent by the emperor into Spain, and in 1812 followed him to Russia, taking part in the bloody engagements at Smolensk and Moskwa. After the relics of the invading force had returned, C. left the imperial service, on account of receiving certain slights in the way of his professional advancement. After the taking of Paris by the allies in 1814, he led back to Poland the remains of the Polish troops who had fought under Bonaparte, and was well received by the Emperor Alexander, who made him a general of division. When the second insurrection of the Poles broke out in 1830, C., who foresaw the hopeless nature of the attempt, concealed himself; but the voice of the nation called him forth from his hiding-place, and on 5th December 1830 he was elected dictator. His moderate views, however, involved him in disputes with the extreme patriotic party, and on the 23d January 1831, he resigned his office; but, to prove his sincerity, he entered the Polish army as a simple soldier, and took part in the murderous battles at Wavre and Grochow. After the suppression of the insurrection, C. went to Cracow and withdrew altogether from public life. He died at Krzeschowitz, 30 September 1854.

CHLO'RAL ($C_4Cl_3HO_2$) is a body formed when anhydrous alcohol is acted upon by dry chlorine gas. It is an oily liquid with a peculiar penetrating odor.

CHLORANTHA'CEÆ, a natural order of exogenous plants, closely allied to the peppers; herbaceous and half-shrubby plants, with jointed stems, opposite simple leaves, and minute stipules between them. The flowers are in terminal spikes, and are destitute of calyx and corolla, but have each a small scale or bract. The stamens are lateral; either only one or few, and partly cohering. The ovary is one-celled, immediately crowned with the stigma; the ovule is pendulous; the fruit a drupe or one-seeded berry; the embryo naked, not in a fleshy sac as in the peppers.—The number of known species is small: all of them are tropical, or natives of China and Japan. They are generally aromatic, and some of them, as species of *Chloranthus* in the East Indies, and of *Hedyosmum* in the West Indies and South America, are used as antispasmodics, stimulants, stomachics and tonics. The roots of *Chloranthus officinalis* and *C. brachystachys* have been ranked among the most efficacious remedies in fevers and other diseases requiring continual and active stimulants, and instances have occurred of great benefit from their employment during the prevalence of epidemics in Java. *C. inconspicuus* is the CHU-LAN of the Chinese; its leaves, spikes of flowers, and berries are used by them for imparting a peculiar fragrance to tea. All the teas which have what is called the *cowslip flavor* owe it to this plant.

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CHLO'RIC ACID (ClO_5) is a compound of one atom of chlorine and five atoms of oxygen, and is generally met with in combination with potash, as the white crystalline salt, chlorate of potash (KO,ClO_5). This salt is mainly interesting from the readiness with which it parts with its oxygen to combustibles, as when thrown on red-hot charcoal, when it causes violent deflagration. The salt is employed in the fabrication of certain kinds of lucifer-matches, which give a slight explosion when struck. If a crystal of chlorate of potash be placed on a piece of paper saturated with turpentine, and a drop or two of oil of vitriol added, it causes the imflaming of the turpentine with explosive rapidity. The chlorate of potash is also used in medicine, with the view of imparting oxygen to the blood.

CHLORI'METRY, or Chloro'metry, is the process of estimating the proportion of available chlorine in bleaching-powder (q. v.), which may vary from 20 to 36 per cent. The process depends upon the great power with which chlorine, in the act of being liberated from its compounds, causes the oxidation of many substances. The salt generally used is pure crystallised sulphate of iron, which in its ordinary state, gives a deep blue color, with a drop of ferridcyanide of potassium, but ceases to do so when it has been fully oxidised, or converted from a proto-salt into a per salt, through the influence of chlorine. It being known that 78 grains or parts of sulphate of iron are oxidised by 10 grains or parts of chlorine, the mode of procedure in C. is as follows: 78 grains of fine crystals of the sulphate of iron are dissolved in water slightly acidulated with hydrochloric acid in a white porcelain basin. A given quantity of the bleaching powder—say 50 grains—is dissolved in a little tepid water, and introduced into a tall measure-glass called a chlorimeter or burette, similar to alkalimeter, which is divided into 100 parts, and water added till the solution rises to the top mark. After subsidence of the insoluble matter, the clear solution is very gradually poured into the solution of sulphate of iron in the basin, the whole being kept constantly stirred, and every now and again a drop of the iron solution is taken out and placed on a new drop of ferridcyanide of potassium placed on a white plate; and whenever the iron solution ceases to produce a deep blue, and only forms a light greenish-yellow tint, it is known that the iron has been fully oxidised by the chlorine. Suppose that at this stage the burette has been emptied to the 55th division; as we know that the liquid poured out must have contained 10 grains of chlorine, we can calculate the chlorine contained in the whole; for

55 : 10 : : 100 : 18·18.

Thus 50 grains of the powder contain 18·18 grains of chlorine, of 36.36 per cent. Protchloride of manganese, subchloride of mercury (calomel), or a solution of indigo of known strength, may be employed instead of the sulphate of iron; but the latter is preferable, and is generally employed by chemists and manufacturers.

CHLO'RINE (Gr. *chloros*, pale green) is a non-metallic element discovered by Scheele in 1774, and named by him *dephlogisticated marine air*. Afterwards, in 1810, Davy proved it to be an elementary body, and gave it the name which it now bears. In nature it is always found in a state of combination. United with sodium (Na), it occurs very largely as the chloride of sodium (NaCl)—common salt—in the ocean; in large beds, as rock-salt; in all natural waters, including even rain-water; in clays, soils, limestone; in volcanic incrustations; and in the vegetable and animal kingdoms. The preparation of gaseous C. by its liberation, directly or indirectly, from common salt, has been fully described under BLEACHING POWDER, which is the form in which C. is prepared and employed commercially. For experimental purposes, the gas may be received in jars filled with water at the pneumatic trough, when the C. rises into the jar, and displaces the water. When thus obtained, it is a yellowish-green gas with a peculiar and suffocating odor, is not combustible, and a very feeble supporter of ordinary combustion. A lighted candle placed in it burns with a very smoky flame, owing to the hydrogen of the oil alone burning, and the carbon being liberated. Several of the metals, such as antimony, copper, and arsenic, in a fine state of division, or in the condition of thin leaves, at once become red hot, and burn when introduced into the gas. A piece of thin paper soaked in turpentine likewise bursts into flame. C. has the symbol Cl, and the atomic weight or equivalent of 35.5. It is a very heavy gas, nearly 2½ times heavier than air, its specific gravity being 2470 (air = 1·00); it is soluble in cold water to the extent of two volumes of C. in one of water, and yields a solution resembling

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the gas in color, odor, and other properties. The principal properties of C. are those of a bleacher of cotton and linen (see BLEACHING), and a most powerful disinfectant (q. v.). The gas can be condensed by pressure and cold into a transparent dark greenish-yellow limpid liquid, with a specific gravity of 1330 (HO = 1000), which also possesses bleaching properties, and a most powerful odor. On the animal system C. acts, in very minute quantity, by producing a sensation of warmth in the respiratory passages, and increasing the expectoration; in large quantity, by causing spasm of the glottis, violent cough, and a feeling of suffocation. The workmen in chemical manufactories, who get accustomed to the C. in small quantity, are generally stout—at least, lay on fat—but complain of acidity in the stomach, which they correct by taking chalk, and also suffer from the corrosion of their teeth, which are eaten away to stumps. The antidotes to the evil effects of the introduction of C. into the lungs are the inhalation of the vapor of water, alcohol, ether, or chloroform; but the two latter should never be resorted to except under medical supervision.

C. unites with the metals and many other substances to form an extensive class of salts known as *chlorides*.

CHLO'RITE (Gr. *chloros*, green), an abundant mineral, consisting of silica, alumina, magnesia, and protoxide of iron, in somewhat variable proportions. It is of a green color, rarely occurs crystallised in hexagonal crystals, sometimes foliated like talc. It is rather soft, and is easily broken or scratched with a knife. Before the blowpipe, it is with difficulty fused on thin edges. It is readily distinguished from talc by yielding water in a closed tube.

CHLO'RITE-SCHIST, or Chlorite-slate, a green slaty rock, in which chlorite is abundant in foliated plates, usually blended with minute grains of quartz, and sometimes with felspar or mica.

CHLO'RODYNE is a patent or quack medicine of considerable popularity, invented by a Dr Collis Browne, but largely imitated by various chemists. It contains opium, chloroform, prussic acid, and probably Indian hemp, and is flavored with sugar and peppermint. As it is apt to separate into two liquids on standing, it should never be taken unless it has previously been well shaken; and as, in taking a dose of chlorodyne, the patient swallows an unknown quantity of three or four of the deadliest poisons with which we are acquainted, it is always advisable to begin with small doses. It is unquestionably a compound which sometimes succeeds in allaying pain and inducing sleep, when opiates have failed; but whether a physician is justified in recommending a remedy with the composition of which he is unacquainted, is a doubtful question. Ten or fifteen drops is the average dose.

CHLO'ROFORM, or the Terchlo'ride of Fo'rmyle (C_2HCl_3), was originally discovered by Soubeiran, and experimented upon by Dumas, and was long known only to scientific chemists as a rare organic body, possessing interest from being one of a series of organic substances, but not known to possess any properties likely to call it into use, or even likely to let it be known by name to the general public. The remarkable power, however, which it possesses of producing anæsthesia, has led to the preparation of C. on a very extensive scale. The materials employed are alcohol, water, and bleaching powder, and the proportions are four parts of bleaching powder, to which sufficient water is added to make a thin paste, and thereafter one part of spirits of wine; the whole is introduced into a capacious retort, which must not be more than half filled, and heat being applied, the C., accompanied by water and a little alcohol, distils over. As the C. is heavier than water, and is not readily miscible therewith, two layers of liquid are obtained in the receiver—the upper being water and alcohol, and the lower being chloroform. The upper liquid being cautiously poured off, the C. is agitated with fused carbonate of potash, which abstracts the remaining traces of water, and on subsequent redistillation the C. is obtained pure and ready for use.

C. is a highly limpid, mobile, colorless liquid, which is very volatile, has a characteristic and pleasant odor, and an agreeable sweetish taste. It has a specific gravity of nearly 1500 (water = 1000), being thus half as heavy again as water, and boils at 140° F. It is not inflammable in the ordinary sense of the term, as it will not take fire when a light is brought down upon it; but when thrown on red-hot coals, it burns with a green flame, evolving much smoke. It is slightly soluble in water

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but more readily mixes with alcohol and ether. It dissolves camphor, amber, copal, and other resins, wax, caoutchouc, black and red sealing wax, iodine and bromine, as well as strychnine and other alkaloids. Its purity may be determined by placing some on the palm of the hand, and allowing it to evaporate, when no alcoholic or other odorous substance should be even momentarily recognised; and by agitation with oil of vitriol, when, on settling, the C. should readily swim on the surface of the vitriol, and the two layers of liquid remain colorless. The employment of C. as an anæsthetic has already been considered under ANÆSTHESIA; but it may be here repeated, that C. is a substance that cannot be too cautiously dealt with, and that it should never be administered except in the presence and by the sanction of a medical practitioner. When skilfully given, it is among the safest of all anæsthetics, and the greatest boon that chemistry has bestowed on suffering humanity.

CHLO'ROPHYLL (Gr. *chloros*, green, and *phyllon*, a leaf), the substance to which the leaves and other parts of plants owe their green color. It is somewhat analogous to wax, is soluble in alcohol and ether, but insoluble in water, and floats in the fluid of the cells, in the form of minute granules. Light is indispensable to its formation, and hence arises the familiar phenomenon of Blanching (q. v.), either from accidental causes, or by the art of the gardener. Young leaves do not exhibit so deep a green as those which have been longer exposed to the light; and the green of a leaf generally deepens till it begins to change into the tints of autumn. *Hydra viridis*, and other minute animals, appear to owe their green color to a substance analogous to chlorophyll.

CHLO'ROPS. See CORN-FLY and WHEAT-FLY.

CHLORO'SIS (Gr. *chloros*, pale green), a peculiar form of anæmia or bloodlessness, common in young women, and connected with the disorders incident to the critical period of life. It has been called the *green sickness*, from the peculiar dingy greenish-yellow hue of the complexion; the green color, however, is not always characteristic. The disease is attended with very great debility, and often with breathlessness, palpitation, and other distressing, or even alarming symptoms. When there is no organic disease present, however, C. may be pronounced curable in a large proportion of cases. The principal means to be employed are air, exercise, often salt-water baths, the use of iron, with a nutritious and rather stimulating diet, and purgatives if required; together with such special remedies as are adapted for restoring deficient secretions, and bringing the entire female system of organs into a natural condition.

CHLORO'SIS, a diseased state of plants, in which a sickly green or greenish-yellow color takes the place of the natural lively hue. Sometimes only a particular shoot is affected by it, but very generally the whole plant; and it seems to depend upon causes which render the plant altogether unhealthy, the pallid appearance being merely symptomatic, and not only the formation of chlorophyll, but all the functions of vegetable life being languidly and imperfectly carried on. Bad seed, damp soil, and cold wet weather, appear to be the most common causes of chlorosis. Plants affected by this disease are often to be seen among crops generally healthy; but whole crops of grain, potatoes, &c., sometimes perish from it, or are much diminished in value. Fruit-trees also suffer from it.

CHOCASD, or Choquard (*Pyrrhocorax*), a genus of birds of the Crow family (*Corvidæ*), differing from the Choughs in having a shorter bill, which, however, is arched like theirs, but resembling them in their habits. The only European species is the Alpine C., also called Alpine Chough, and Alpine Crow (*P. Pyrrhocorax*). It is about the size of a jackdaw, of a brilliant black, with yellowish bill and red feet.

CHOCKS are pieces of wood employed on ship-board to aid in the support of various articles. Amongst them are anchor-chocks, rudder-chocks, boat-chocks, stow-wood chocks, and chocks to support the ends of the beams.

CHO'CO, a bay and province of New Granada, in South America—1. The bay, forming part of the Gulf of Darien, receives the Atrato (q. v.), a stream of note in connection with inter-oceanic communication. Its lat. and long. are about 8° 30 n., and 77° 30' w.—2. The province forms the west portion of the department of Cauca (q. v.).

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CHO'COLATE is made from the seeds of *Theobroma Cacao* (see COCOA), reduced to a fine paste in a heated iron mortar, or by a machine, and mixed with pounded sugar and spices, as cinnamon, cloves, cardamom, vanilla, &c. The paste is then poured into moulds of white iron, in which it is allowed to cool and harden. C. is sometimes made without spices, but is then more generally called Cocoa. The paste is sometimes mixed with flour, and with Carrageen or with Iceland Moss; and for medicinal purposes with cinchona, &c. C. is used as a beverage and for this purpose is dissolved in hot water or milk. Sometimes the yolk of an egg is added, and sometimes it is dissolved in soup or wine. It is also employed in making certain liqueurs. In a pure state it soon satisfies the appetite, and is very nourishing; when it contains spices, it is also stimulating. Good C. is externally smooth, firm and shining—not gritty in the fracture—easily soluble, aromatic; not viscid after having been liquefied and cooled, but oily on the surface, and leaves no sediment of foreign substances. C. is adulterated in many ways by mixing it with rice-meal, oatmeal, flour, potato-starch, roasted hazel nuts or almonds, and with benzoin, storax, &c., in place of vanilla. The Mexicans from time immemorial were accustomed to prepare a beverage from roasted and pounded cocoa, dissolved in water and mixed with maize-meal and spices. This they called Chocolatl (*chocs*, cocoa, and *latl*, water). From the Americans the Spaniards derived an acquaintance with C., and by them it was introduced into Europe in 1520. C. is used in South America, Spain and Italy more than in other parts of the world, although it is used to a considerable extent in Germany. Its use in Britain has given place in a great measure to that of the simpler cocoa.

CHOCOLATE ROOT. See GEUM.

CHOIR (Lat. *Chorus*). In its literal sense, the C. is the portion of the church devoted to the singers; and in all descriptions which concern the ritual it is so limited, including only the space from the western door or screen to the end of the stalls, whilst the part from the stalls eastward to the high-altar is called the presbytery. But in ordinary language, and even as used by architects, it denotes the entire space which is enclosed for the performance of the principal part of the service. In this sense, it includes the C. proper and the presbytery, and corresponds to the chancel in parish churches. Where the church is cruciform, and the term is confined to the eastern limb, it comes to be entirely different from the C. in the ritual sense, or the stall-place, which in such a building is commonly situated either under the tower or in the nave. In large churches, the aisle generally runs along each side of the C., and frequently passes across the east end of it; an arrangement which is very common in the larger churches of the continent which have polygonal or semicircular terminations.—C. is also the name given to the singers of the choral service.

CHOIR-SCREEN, or Choir-Wall, the screen or wall which divides the choir and presbytery from the side aisles. It is often very richly ornamented.

CHOISEUL-AMBOISE, Etienne François, Duc de, minister of Louis XV., was born June 18, 1719, educated by the Jesuits, and on the completion of his studies, entered the army. He fought bravely in the Austrian Wars of Succession; but only after he had attracted the fancy of the king's mistress, Madame Pompadour, did fortune also really favor him. Through the influence of Madame Pompadour, he was made lieutenant-general in 1748, ambassador to the courts of Rome and Vienna in 1756, and Duc de Choiseul in 1758. C. now became instrumental in bringing about a family league of the Bourbon monarchs in Europe; and in 1763, at the close of the war so disastrous to the French arms, he obtained, by his prudence and dexterity, milder terms for his nation than had been expected. This made him very popular, as did also his successful attempt to overthrow the Jesuits. In 1764, Madame Pampadour died, but the power of C. continued unabated. He conceived, and almost carried out, a plan for the formal emancipation of the Gallican Church from papal influence, paid great attention to the improvement of the army and navy, developed the trade and industry both of the nation and of the colonies, and opened up anew an intercourse with India, whose native princes were assisted by French officers in their endeavors to expel the British from the peninsula. He had spies in every European court, and so ruled all diplomatic and political cabals, that the Empress of Russia,

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who dreaded him, called him *Le Cocher de l'Europe* ("The Driver of Europe"). But the rise of Madame Dubarry, who succeeded Madame Pompadour in the royal affections, gradually alienated Louis from his able minister, and in 1770 he retired to his magnificent estate of Chanteloup, where he lived in princely splendor. After the accession of Louis XVI., C. received permission to return to Paris. He was often consulted, but never recovered his official position. He died May 7, 1785.

CHO'KE-CHERRY, a name given to certain nearly allied species of Cherry (q. v.), of the Bird-cherry section of the genus or sub-genus, natives of North America, having small fruit in racemes, and the fruit at first rather agreeable, but afterwards astringent in the mouth. Some confusion has long existed as to the different kinds, and their botanical names (*Prunus* or *Cerasus Virginiana*, *serotina*, and *borealis*) are not more determinate than the popular ones. Perhaps they ought to be regarded as mere varieties rather than distinct species. They have a considerable resemblance to the Portugal Laurel, although the leaves are deciduous. The bark is used as a febrifuge and tonic, under the name of *Wild Cherry Bark*; and by distilling it with water, a volatile oil is obtained from it, associated with hydrocyanic acid, called *Oil of Wild Cherry*. This bark allays nervous irritation, and is particularly suitable as a first tonic in cases of recovery from fever or inflammation.

CHO'KE-DAMP. See CARBONIC ACID.

CHOKING, the obstruction of the gullet, or of the passage leading to it, by morsels of food imperfectly chewed, or other substances accidentally swallowed. The consequences of C. in the human subject are serious, and will be best considered in connection with the parts concerned. See PHARYNX and ŒSOPHAGUS. What follows relates to the C. of cattle.

Causes.—These may be classified under two heads: 1. Those that depend on the material swallowed; and 2. Those that depend on the animal swallowing. Under the first head we find sharp pointed objects which become fixed into or entangled in the membrane lining the throat and gullet; solid masses too large to pass on to the stomach; dry, farinaceous materials which clog in the passage. The second class of causes consists in inflammation of the throat, or irritation of the organs of deglutition; constrictions of the passage, as in crib-biting horses; ulceration of the œsophagus, which is apt to run after C., and is the cause of a relapse; lastly, without any disease of the deglutating organs, an animal may be choked by eating too greedily, and imperfectly masticating or salivating its food.

Symptoms.—These vary according to the position of the obstruction. If high up in the pharynx, the animal cannot swallow, evinces great distress, and attempts to cough up the object. Saliva drivels from the mouth, the animal chews, and makes an occasional ineffectual effort to swallow. The breathing is very greatly disturbed. In some cases, a large lump of food has become fixed in the larynx or upper part of the windpipe, and has suddenly suffocated the animal. When the obstruction is in the course of the gullet down the neck, the symptoms are very similar, though less urgent, and there is additionally the local sign of swelling, with the peculiar hardness or softness of the substance indicating its nature. When an animal is choked by a substance lodging in the gullet within the chest, the symptoms are more mysterious, and likely to mislead. The animal swallows; a considerable quantity of liquid may enter the gullet, but it is suddenly regurgitated or thrown up, as in the act of vomiting. The distress is great; and in the course of three or four days, unless the animal is relieved, it dies of prostration. In the ox, sheep, and goat, the most alarming symptoms, in any case of C., arise from the paunch becoming distended by gas. This condition will be treated under the head HOVEN.

Treatment.—Remove the obstruction with the hand, when you can. Cause the animal to swallow the substance, if possible, by giving it water or oil. Carefully push the offending agent down by a probang, if it is possible to effect this, and if withdrawal by the mouth is impracticable. In some cases, the gullet has to be cut into by a qualified surgeon. After a case of C., keep the animal on soft food, and attend to its general health, in order to avoid a relapse, which is of frequent occurrence in cattle.

CHO'LERA, a Greek term used in the Hippocratic writings, but of indeterminate etymology, being derived perhaps from *cholé*, bile, or from *cholera*, a water-spout or gutter. It is now universally employed in medicine as indicating one of two or three

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forms of disease, characterised by vomiting and purging, followed by great prostration of strength, amounting in severe cases to fatal collapse. The variety called *cholera sicca* (dry C.) by ancient writers (in which collapse and death take place without discharges) is comparatively rarely observed. The milder forms of C. occur almost every summer and autumn, even in temperate latitudes, and are hence termed by some—in reference to this country, and by way of contrast—British or Summer C., while the more devastating and fatal forms of the disease are generally supposed to originate only in tropical countries—especially in India—and thence to be propagated epidemically over vast populations, and in a somewhat regular geographical course, reaching this country usually through Persia, the steppes of Tartary, Russia, and the Baltic, at the same time extending to Egypt, Turkey, and the south of Europe. These very fatal forms of the disease are commonly called Asiatic, Oriental, or Epidemic C.; sometimes Cholera Morbus, or Pestilential Cholera. The milder forms are sometimes also called Bilious C.; and the severer, Spasmodic C., from the character of the symptoms in each. Some writers of great authority are inclined to consider the two forms as one disease, varying in individual cases and according to season. It is certain that it is not always possible to distinguish the one form from the other in particular instances; but the marked difference between the mortality of groups of cases of British C. on the one hand, and of Oriental or Asiatic C. on other, renders it probable that there is something in the latter disease which amounts to a distinction in kind. Whether in the milder or severer form, C. is usually ushered in by a period of premonitory symptoms, when the more distinctive characters of the disease are not established, the case resembling one of common diarrhœa (q. v.) or looseness of the bowels. At this stage, it is very apt to be neglected, and unfortunately, in the severer epidemic forms of the disease this is the only stage much under control. Whenever, therefore, there is a reasonable suspicion that Epidemic C. is threatened, every person attacked with diarrhœa should make a point of placing himself under medical advice, and, if possible, of escaping from any situation in which epidemic disease is known to be prevalent. He should also be particularly attentive to diet, and especially to the purity of the water he drinks, and to its absolute freedom from contamination by animal matters filtering through the soil, or thrown into water-courses by sewers, &c. If water absolutely cannot be had in a pure state, it should be boiled before being used for drink, or indeed for any domestic purpose. Many cases of C., and several local epidemics, have been traced in the most positive manner to organic impurities of the drinking-water; and no single case of the disease has been established by so much evidence as this. Hence, in all probability, arises the well-known preference of C. for low situations, and particularly for the low-lying flats on the banks of rivers, especially where the inhabitants are supplied with water from streams polluted by sewerage, and wells into which the contents of drains are permitted to filter from a superior elevation.—See Dr Snow's work on the Communication of Cholera, 2d edition, 1855; also the Report of the Registrar-general of England on the Cholera of 1848—1849, and his 17th Annual Report, for 1854.

It is hardly within the scope of a work such as this to present a minute description of fully developed C. in its severer or Asiatic variety. It is truly an appalling pestilence,* too easily recognised by a few leading features. After some hours or days of simple relaxation of the bowels, vomiting commences, and occurs again and again, accompanied by frequent and extremely copious discharges downwards, at first of matters colored with bile as usual, but in the end of colorless and turbid fluid resembling water in which rice has been boiled. These discharges (often to the extent of gallons of liquid), succeeding each other with the most alarming rapidity, act as a drain upon the fluids of the body generally; and by the changes they effect upon the blood, contribute to bring about the state called *collapse*. In this condition, the patient lies motionless and apathetic, except when tormented by cramps, which are of frequent occurrence; the surface is cold; the finger-ends, lips, and tip of the nose become livid; the eyes are deeply sunk in the sockets, and often

*The epidemic of 1848—1849 carried off 53,293 persons in England and Wales; and that of 1854, 20,097 persons. See the Registrar-general's Report for the latter year. This estimate is exclusive of cases of fatal diarrhœa.

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bloodshot; the tongue is clammy; the breath without any sensible warmth when caught on the hand; the pulse is suppressed at the wrist, the breathing extremely slow and feeble, the heart just audible through the stethoscope. Purging and vomiting have ceased; even the urinary secretion is dried at its source. In fact, all the vital processes are nearly brought to a stand, and unless reaction comes, a few minutes, or at most a few hours, suffice to bring life to a close. Reaction in the most favorable cases is gradual and without accident; it is not unfrequently, however, accompanied by fever, closely resembling typhus, and constituting, at least in the temperate zone, one of the chief dangers of the progress of cholera.

Medicine is almost powerless against C., except in the earliest stages, in which the treatment usually pursued in diarrhœa (q. v.) has sometimes been found useful. Very remarkable temporary restorative effects have been found to follow the injection into the veins of dilute solutions of saline matter, resembling as nearly as possible the salts of the blood which are drained away in the discharges. Unhappily, these experiments have as yet only very imperfectly succeeded. The patient is restored to life, as it were, from the very brink of the grave; but he revives only for a few hours, to fall back into his former condition.

The true medicine of C., so far as we yet know, is preventive medicine. The measures to be adopted have been partly pointed out above; in addition, it may be said that personal cleanliness is of the first importance; and that all unnecessary contact with the sick should be avoided, as the disease is probably to some extent contagious, though by no means in the highest degree. In short, all the precautions are to be taken which are recommended in the case of Epidemic Disease (q. v.)

CHOLE'STERINE is one of those bodies which are termed by chemists lipoids, or non-saponifiable fats. It was originally discovered in gall-stones, but is now recognized as an ordinary constituent (although occurring in very minute quantity) of bile, blood, and the tissue of the brain. It likewise occurs in pus, the contents of cysts and other morbid fluid products.

It separates from its solution in glistening nacreous scales, which, when examined under the microscope, appear as very thin rhombic tablets, whose obtuse angles are 100° 30′, and whose acute angles are 79° 30′. Different formulæ have been assigned for its composition, the one generally accepted being $C_{27}H_{44}O$. It is not always very easy of detection in animal fluids, but if, by its insolubility in water, acids, and alkalies, and its solubility in hot alcohol and ether, it has been recognised as a fatty substance, it may be readily distinguished from all similar substances by the measurement of the angles of its rhombic tablets. The best method of preparing C. is by boiling gall-stones containing it in alcohol, and filtering the solution while hot. From this hot filtered solution it crystallises as the fluid cools.

Chemists have obtained substances known as *cholesterilins* and *cholesterones* from the decomposition of cholesterine.

CHOLET, a town of France, in the department of Maine-et-Loire, on the right bank of the Maine, 32 miles south-west of Angers. Here, during the Vendean war, two actions were fought in 1793, in both of which the royalists were defeated. In the first, they lost their brave general Bonchamps; and the second drove them across the Loire, thus virtually deciding the war against them. It has manufactures of fine woollen and mixed fabrics, and leather, and a trade in cattle. Pop. (1872) 11,328.

CHOLU'LA, a once flourishing, but now decayed, town of Mexico, 60 miles to the east-south-east of the capital, and 15 to the west-north-west of La Puebla. Cortes found in it 20,000 houses, and as many more in the suburbs, and also 400 temples. Now the place contains only about 10,000 inhabitants. Its most remarkable memorial of aboriginal times is a pyramid of clay and brick, surmounted on the top by a chapel of Spanish origin. Its height is 177 feet, while the side of its base measures 490 yards. C. stands on the table-land of Anahuac, at an elevation of 6912 feet above the level of the sea.

CHO'NDA, a town of Gwalior, 18 miles to the north-west of the fort of the latter name, in lat. 26° 27′ n., and long. 78° e. It claims notice merely as the scene of a decisive gained by Sir Hugh, afterwards Lord Gough, over the Mahrattas, on 29th December 1843.

CHO'NDRINE. See GELATINE.

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CHONDROPTERY'GII. See CARTILAGINOUS FISHES.

CHO'NETES, a genus of fossil brachiopodous mollusca, nearly allied to the well-known genus *Productus*. It is characterised by its transversely-oblong shell, and by having the long margin of the ventral valve armed with a series of tubular spines. Twenty-nine species have been described from the Palæozoic formations.

CHO'NOS ARCHIPELAGO, a group of islands off the w. coast of Patagonia, lat. 44°—46° s., long. 74°—75° w. With the exception of a few of the most westerly, all are bare and scantily peopled, though several are of considerable extent.

CHOPIN, Frédéric, a distinguished Polish pianist and musical composer. He was born at Zela-zowa-wola, near Warsaw, in 1810, and studied music at Warsaw under Professor Joseph Elsner. An exile after the revolution of 1830, he took up his residence in Paris, where he lived admired both professionally and in society. His health, always delicate, broke down in 1837, when he went for a time to Majorca, from which he afterwards returned, benefited by the change. After again suffering much from illness and depression of spirits, he visited England and Scotland in 1848, and in London was welcomed with enthusiasm in public and private. He never recovered from the fatigues of this journey, but died in Paris, 17th October 1849, and was buried, by his desire, beside Bellini, in the cemetery of Père-la-Chaise. His compositions, restricted to pianoforte music, are in high esteem among musicians, and consist chiefly of preludes, notturnos, polonaises, mazurkas, and valses, with a few concertos and sonatas. They are pervaded by a sensitive, restless, and highly poetic fancy, and abound in subtle ideas, graceful and original harmonic effects, and rich ornamentation. The so-called polonaises, mazurkas, and valses are not dance music, but dreamy compositions suggestive of the rhythm and character of these dances, in which the peculiarities of Polish national music are blended with French elegance and taste.

CHO'PIN (Scotch, *chappin*), the name of a Scotch liquid measure equivalent to the English quart.

CHO'PINE (Spanish, *chapin*), a high clog or slipper, deriving its name, as is supposed, from the sound *chap, chop*, made by the wearers in walking. Chopines were of Eastern origin, but were introduced into England from Venice during the reign of Elizabeth. They were worn by ladies under the shoes, and were usually made of wood covered with leather, often of various colors, and frequently painted and gilded. Some of them were as much as half a yard high; and in Venice, where they were universally worn, their height distinguished the quality of the lady. The C. is mentioned by Shakespeare in "Hamlet."

CHORA'GIC MONUMENTS. The choragus or person at Athens who, on behalf of his tribe, had supported the chorus (q. v.), and who, in competition with the other tribes, had exhibited the best musical or theatrical performance, received a tripod for a prize; but he had the expense of consecrating it, and of building the monument on which it was placed. There was at Athens a whole street formed by these monuments, called the "Street of the Tripods."

CHO'RAL MUSIC, the ancient music of the church. Music in parts for different voices. See SACRED MUSIC.

CHORAL SERVICE, the musical service of the English Church, celebrated by a full complement of clergymen and choristers in a cathedral church, and when all those parts of the service are sung as ordered in the rubrics.

CHORA'LE, a musical term adopted from the German, means a melody to which sacred hymns or psalms are sung in public worship by the whole congregation in unison. The melody of the C. moves in notes of a slow and strictly measured progression, and of a solemn and dignified character that disposes the mind to devotion. Although the term C. is now always applied to the music of the Protestant Church, it belonged to the Christian Church at all times, as melodies still in use can be traced with certainty to have been sung by the congregations in the first centuries of Christianity. Among these is the song of praise by St Ambrose, still retained in the Lutheran Church, to the words "Herr Gott dich loben wir." The C. is intimately connected with the history of music, as vocal music was the only kind used in worship until far on in the middle ages. The C. is precisely what our

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psalm tune is, or rather what it formerly was, and ought again to become. The pure, simple C. has, in a great degree, been cast aside in the British Isles, and its place occupied by tunes of a comparatively puerile style, which are frequently only adaptations of operatic songs and other profane pieces.

CHORD. The C. of an arc of a curve is a straight line joining its two extremities. A SCALE OF CHORDS is used in laying off angles.

CHORD, in Music, is the simultaneous and harmonious union of different sounds, at first intuitively recognised by the ear, and afterwards reduced to a science by the invention of the laws or rules of harmony. See HARMONY. Chords may consist of from two to five parts. Absolute chords of two parts are produced only by thirds or sevenths. Chords of more than two parts are either fundamental chords or inversions of them, and are divided into concords and discords. The union of sounds in all chords will be found, on analysing their component parts, to be an admixture of major and minor thirds. The common chord, or *Trias harmonica perfecta*, is the basis of all harmony, and consists of a bass note, or prime, with its third and fifth above. These three sounds are at a distance of a third from each other. When the lowest third is the greater third, the C. is a major chord; but when the lowest third is the lesser, the C. is called a minor chord. A chord of two minor thirds combined is called diminished, as the interval from the lowest note to the highest is less than a perfect fifth. The common C. admits of two inversions, according as one or other of its notes is made the bass, or lowest note of the C. By adding another third above the common C., a C. of four parts is produced, which is called the chord of the seventh, because the highest note is a seventh above the bass. When the C. of the seventh is produced on the fifth of the scale, it is then called the dominant seventh, which is the most perfect species of the C. It then consists of a major third, perfect fifth, and seventh, the minor, which is the next harmonic produced by nature above the fifth. The C. of the seventh may also be formed on any of the notes of the major or minor scale taken as a bass note, which produces the varieties of major, minor, and diminished sevenths. The C. of the seventh admits of three inversions, according as the notes above the fundamental notes are used as bass notes. From its nature, it requires a resolution, and is therefore always followed by a common C. whose fundamental bass is a fifth below that of the seventh. For the C. of the ninth, see HARMONY. The first proper arranged system of chords is by Rameau, in 1720, which has from time to time been extended and improved by Marpurg, Kirenberger, G. Weber, F. Schneider, Marx, and the late Professor S. W. Dehn of Berlin.

CHORE'A (Gr. *choreia*, a dancing or jumping), a disease popularly called St Vitus's Dance, and consisting of a tendency to involuntary and irregular muscular contractions of the limbs and face, the mind and the functions of the brain generally being quite unaffected. The spasms of C. differ from those of most other convulsive affections in being unaccompanied either by pain or rigidity; being, in fact, momentary jerking movements, indicating rather a want of control of the will over the muscles, than any real excess of their contractions. In some cases, the disease resembles merely an exaggeration of the restlessness and "fidgetiness" common among children; in others, it goes so far as to be a very serious malady, and may even threaten life. Fatal cases, however, are fortunately very rare, and in the large majority of instances the disease yields readily to treatment carefully pursued, or disappears spontaneously as the patient grows up. C. is a disease much more common among children of six years old and upwards, than at any other period of life: it is also more common among female children than among males. The treatment generally pursued is the use of metallic tonics, such as zinc, copper, iron, and arsenic (the last, perhaps, the best), sometimes preceded or accompanied by purgatives. Exercise in the open air is also to be recommended; and gymnastics afford material aid in the cure. It is to be observed that the name St Vitus's Dance (Dance of St Veit) was applied originally in Germany to a different form of disease from that above referred to—one closely approaching in its characters the epidemic "dancing mania," which, in Italy, was called Tarantism (q. v.).

CHO'RLEY, a town in Lancashire, on a hill on the Chor, 9 miles south-south-east of Preston. It has an ancient parish church, supposed to be of Norman origin, and manufactures of cotton-yarn, jaconets, muslins, fancy goods, calicoes, and

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ginghams. In the vicinity are several coal-mines, a lead-mine, besides mines and quarries of iron, alum, slates, millstones, &c. Pop. (1871) 16,864.

CHO'RUS, among the ancients, meant a band of singers and dancers employed on festive occasions of great pomp, and also in the performance of tragedy and comedy on the stage. In the time of the Attic tragedy, the C. consisted of a group of persons, male and female, who remained on the stage during the whole performance as spectators, or rather as witnesses. When a pause took place in the acting, the C. either sang or spoke verses having reference to the subject represented, which served to increase the impression or sensation produced by the performers. At times, the C. seemed to take part with or against the persons in the drama, by advice, comfort, exhortation, or dissuasion. In early times, the C. was very large, sometimes consisting of upwards of fifty persons, but afterwards it was much reduced. Its leader was termed the Coryphæus. The charge of organising it was considered a great honor among the citizens of Athens. The person appointed for this purpose was called the *choragus*. The honor was very expensive, as the choragus had to pay all the expenses incurred in training the members of the C. to perform their parts efficiently. They were, besides, fed and lodged by him during training-time, and he had also to provide for them masks and dresses. At times, the C. was divided, and spoke and sang antiphonally. These divisions moved from side to side of the stage, from which movement originated the naming of the single songs or stanzas, such as Strophe, Antistrophe, and Epode. How the musical element of the ancient C. was constituted or composed, is not known with any certainty. Possibly, it was only a kind of rhythmical declamation, and doubtless very simple. It was accompanied by flutes in unison. With the decline of the ancient tragedy, the C. also fell into disuse; and only lately has there been an attempt to produce the same on the stage, in the manner of the ancients, as, for example, in Schiller's "Bride of Messina." The music which has been set in modern times to some of the Greek tragedies, does not give the least idea of the original music.

In modern times, by C. is understood the union of singers or musicians for the joint performance of a musical work. C. is also the name given to a musical composition for numerous voices, either with or without accompaniment, and intended to express the united feelings of a multitude. The musical C. is the only artistic means by which a simultaneous movement or sentiment of a multitude can be represented in the drama, the language or text being always of a simple rhythm, permitting only of a limited movement suited to the combination of a multitude. It is, however, not always necessary that every part of the C. should manifest the same feeling or sentiment. Two or more parts of the C. may act against each other, as suits the purport of the drama. Double, triple, and quadruple choruses are found in the old Italian compositions for the church. In modern times, the C. is much used, and with great effect, in operas, especially those of Meyerbeer and Wagner. In the oratorio, the C. is of the greatest importance, and the numbers now employed to sing the C. far exceed anything attempted a century ago; but this is not always an advantage, for the *tempi* must necessarily be taken much more slowly, which has a sluggish effect; while increase in the number of voices does not always produce a greater power of sound. The C. of thirty-five well-trained voices from the pope's chapel, who sang at the coronation of Napoleon I., in the cathedral of Notre Dame, Paris, produced a far greater and more wonderful effect when they entered singing the *Tu es Petrus* than another C. of hundreds of voices, and eighty harps, that had been assembled and trained for the same occasion, in expectation of surpassing all that man could imagine. The greater the number, the greater is the difficulty in obtaining unity.—C., in organ-building, is the name given to stops of the mixture species, some of which contain 2, 3, 4, 5, 6, or more pipes to each note, tuned at consonant intervals in relation to the fundamental stops.

CHOSE IN ACTION, in the law of England, is that kind of property which consists not in possession, but in the legal right to possess. As this right can, in general, be vindicated and made available only by means of an action, the property to which it relates, whether real or personal, is called a thing (*res* or *chose*) in action, to distinguish it from a thing already in possession. Money due upon bonds and bills, goods bought and not yet delivered, are examples of choses in action, as is also the right to compensation for damage occasioned by breach of contract. "By

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the strict rule of the ancient common law, no chose in action could be assigned or granted over, because it was thought to be a great encouragement to litigiousness, if a man were allowed to make over to a stranger his right of going to law. (See CHAMPERTY.) But this nicety is now not so far regarded as to render such a transaction really ineffectual. It is, on the contrary, in substance, a valid and constant practice; though, in compliance with the ancient principle, the form of assigning a chose in action is in the nature of a declaration of trust, and an agreement to permit the assignee to make use of the name of the assigner, in order to recover possession. . . . The king is an exception to this general rule, for he might always either grant or receive a chose in action by assignment; and our courts of *equity*, making the rule itself give way to expediency, in a commercial point of view, of facilitating the transfer of property, allow the assignment of a chose in action as freely and directly as the *law* does that of a chose in possession."—Stephen's "Commentaries," ii. p. 45. One would imagine that the more convenient and philosophical arrangement would be, by the interposition of the legislature, to make law conform at once to equity and expediency.

CHO'TA NAGPO'RE, or Nagpore the Less, one of the lower provinces of Bengal, containing five British collectorates, besides seven tributary minor states. The total area is 43,901 square miles, and in 1871 the number of its inhabitants was 3,825,571, consisting chiefly of aboriginal tribes who are little removed from barbarians. The country is for the most part wild and hilly, consisting of an undulating plateau 3000 feet above the sea. Its chief products are coal, jute, tea, and indigo; iron is also found. From the elevation of the tract, the temperature varies considerably, ranging in winter from 32° to 62°, and in summer from 78° to 98°.

CHOUANS were bands of insurgent Royalists, who, during the French Revolution, organised a reactionary movement in Brittany. They obtained their name from their leader, Jean Cottereau. This person, who had been a smuggler, went by the name of Chouan—a corruption, it is said, of *chat-huant* ("screech-owl")—because, while he and his accomplices were engaged in their nocturnal work, they were wont to be warned of their danger by some one on the watch imitating the cry of this bird. At the period of the revolt, however, he followed the humble occupation of a clog-maker. The first indications of an anti-revolutionary spirit in Brittany manifested themselves in the beginning of 1791, when several trees of liberty were destroyed at night, and other more serious outrages committed. These disturbances were fomented by seditious priests. In 1792, an insurrection was planned by the Marquis de la Rouarie, with the sanction and approval of the two brothers of Louis XVI. The agents of the marquis entered into communications with Jean Cottereau—well known for the reckless audacity of his character—and other smugglers; but having the misfortune to be arrested, the carrying out of the insurrection devolved upon the latter. The *Chouanerie*, as the insurrection was called, at first disgraced itself, both by the drunken licence and the cruelty which marked it. After several successful exploits of the guerrilla sort, Jean Cottereau perished in an engagement which took place on the 28th July, 1794, near the wood of Misdon, the theatre of his first efforts. Before this, however, other and more illustrious leaders had appeared in Brittany to direct the movement, the chief of whom were Georges Cadoudal (q. v.) and Charette. Through their endeavors it was more widely extended, and for a time seemed likely to imperil the security of France, but was suppressed towards the close of 1799. Petty *spurts* of insurrection, however, broke out till about 1803, when the *Chouanerie* ceased for awhile. In 1814—1815, it again made its appearance on both banks of the Loire; and after the July revolution, was once more excited by the Duchess of Berry on behalf of the Duke of Bordeaux, but crushed by the energetic measures taken by M. Thiers.

CHOUGH (*Fregilus*), a genus of birds of the crow family (*Corvidæ*), but approaching to the characters and appearance of the starlings (*Sturnidæ*). The length of the bill has induced some naturalists, among whom was Cuvier, to place them beside the hoopoes, but this is now generally regarded as an error; they agree with crows in having their nostrils covered with stiff bristles directed forward, and in their habits. The beak is longer than the head, strong, arched, and pointed. The tail is slightly rounded. The only European species is the common C., sometimes called the Cornish C., or Red-legged Crow (*F. graculus*), a widely distributed but

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very local bird, inhabiting the Swiss Alps, the high mountains of Spain, of Greece, of India, and of Persia, the south of Siberia, the north of Africa, and some parts of the British sea-coasts; but almost exclusively confined to situations where there are high cliffs. In these it generally makes its nest; sometimes, however, in ruined towers. Its long hooked claws enable it to cling easily to a rough rock, but it seems unwilling even to set its feet on turf. It lives in societies like the rook. It feeds on insects, berries, grubs, and grain. It is easily tamed, becomes very familiar and forward, and exhibits in the highest degree the curiosity, the pilfering disposition, and the delight in brilliant or glittering objects, which also characterise others of the crow family.—Other species of C. are known, natives of Australia, Java, &c. Some naturalists unite the chochards and the choughs into one genus.

CHOYA. See CHAY ROOT.

CHRISM (Gr. *chrisma*, ointment) is the name given to the oil consecrated on Holy Thursday, in the Roman Catholic and Greek Churches, by the bishop, and used in baptism, confirmation, orders, and extreme unction. There are two kinds of C.—the one, a mixture of oil and balsam, is used in baptism, confirmation, and orders; the other, which is merely plain oil, is used in extreme unction.

CHRI'SOME, the name of the white vesture laid by the priest on the child in former times at baptism, to signify its innocence. It was generally presented by the mother as an offering to the church, but if the child died before the mother was "churched" again, it was used as a shroud. By a common abuse of words, C. came to be applied to the child itself. A C. child is a child in a C. cloth. As late as Jeremy Taylor ("Holy Dying," c. i, s. 2), we have the following: "Every morning creeps out of a dark cloud, leaving behind it an ignorance and silence deep as midnight, and undiscerned as are the phantasms that make a chrisome child to smile."

CHRIST, a title of our Saviour (see JESUS), now in general use almost as a name or as part of his name. It is originally Greek, signifies *anointed*, and corresponds exactly in meaning and use with the Hebrew word MESSIAH (q. v.); so that this title given to Jesus of Nazareth, is an acknowledgement of him as the Saviour long promised to the house of Jacob and to the human race. As prophets, priests, and kings were anointed on being called to their several offices (1 Kings i. 34, 39; 1 Sam. xvi. 13; Exod. xxix. 7), so the Saviour was anointed as at once prophet, priest, and king; the Holy Spirit, often represented under this figure, being given to him to qualify his human nature for all that belonged to his mediatorial office and work.

The whole system of Christianity depends on the doctrine of the PERSON OF CHRIST. An essential difference necessarily exists on almost every point between the systems of doctrine maintained by those who do and by those who do not acknowledge a union of the divine and human natures in his person. Some of the early heretics maintained an opinion, which has long ceased to have any supporters, that the body of C. was not a real body, but a mere visionary appearance. See DOCETÆ and GNOSTICS. The opposite extreme is that of Socinians, by whom C. is regarded as a mere man; whilst Arians (q. v.) regard him as in his *pre-existence*—i. e., before his *incarnation*—the highest of all created beings; and according to the generally received doctrine of Christians, he is "God and man in two distinct natures and one person." This doctrine, of course, bears a most intimate relation to that of the TRINITY (q. v.); and all who hold the divinity of Jesus Christ, regard him as the incarnate Second Person of the Godhead. The proof of the whole doctrine may almost be said to consist simply in a proof of the *divinity* of C.; his real *humanity*, although equally important, being no longer disputed. And this proof is found, not so much in particular texts which directly assert the divinity of C.—although such texts are important—as in the multitude of texts which imply it, and admit of no reasonable or natural explanation apart from it; and in shewing that certain doctrines are taught in Scripture which cannot be maintained without this.

The ancient Apollinarians, Eutychians, Monophysites, &c., regarded C. as having only one nature—a *compound* of the divine and human; but such a notion as that C. had only a human body, the divine nature supplying the place of a soul, is held to be subversive of the whole Christian system; and his human nature, to be real, must be viewed as consisting both of a true body and a true soul. His human

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nature never existed, however, apart from his divine nature, and was "conceived by the power of the Holy Ghost."

Closely connected with this subject is that of the *humiliation* and consequent *exaltation* of C., in his character of mediator between God and man; a subject, to the former branch of which belongs the whole doctrine of the *work* of C. for the redemption of sinners, including the great doctrine of ATONEMENT (q. v.). To the latter belongs the doctrine of the reward of his work, in his sitting at the right hand of God and having all things put under his feet; not only exercising dominion as king in his church, but over all things for the advancement of the salvation of his church and of every member of it; while also he sends forth the Holy Spirit to apply to men the blessings which, as the reward of his work, He has mediatorially obtained for them, and still continuing to act as a priest, makes continual INTERCESSION (q. v.), founded upon his work and sacrifice.

CHRIST, Order of, in Portugal. When the Templars were expelled from France, and their property confiscated by Philippe le Bel, with the sanction of Pope Clement V., they were received into Portugal, and their order revived in 1317, under the title of "the Order of our Lord Jesus Christ." With some difficulty, Pope John XXII. was induced to sanction the new order. The Knights of the Order of Christ joined the Portuguese in all their crusades against the infidel, and also in their African and Indian expeditions, receiving in compensation continual additions to their own possessions. The grand prior of the order was invested by Pope Calixtus III. with power equal to that of a bishop; and, as an encouragement to adventure, the knights were promised all the countries which they might discover, to be held under the protection of Portugal. At length, their wealth and power excited the jealousy of the kings of Portugal; their future acquisitions, and, subsequently, even their actual possessions, were declared to be crown possessions, and the offices of administrator and grand-master were transferred to the crown. A fine cloister belonging to the order is still to be seen at Tomar, to which place the seat of the order was transferred from Castro-Marino in 1366. Noble descent, and three years' military service against the infidel, were required for admission. The members took the three monkish vows of chastity, poverty, and obedience, till the pope released them from the first two, on condition of their applying the third part of their revenues to the support of Tomar cloister, the priests of which were bound by the three vows. This cloister is now a theological institution for the instruction of the priests of the order.

It is said that the order still possesses 26 villages and farms, and 484 prebends. It is very numerous—consisting of 6 knights of the Grand Cross, 450 commanders, and an unlimited number of knights. Catholics of noble descent alone are admitted, and foreigners are excluded from participation in the revenues, being exempted in return from its rules.

CHRIST, The Papal order of. This is a branch of the Portuguese order, created by Pope John XXII. It has only one class.

CHRIST, Pictures of. To represent the form and countenance of C. in a manner that shall even approximate to the latent ideal in the minds of men, is unquestionably the most sublime, and the most difficult work which an artist can undertake. It is the highest pictorial effort of the creative faculty. From a very early period in the history of the church, we can trace the growth of the endeavor. At first, indeed, the horror entertained for the idols of the pagans, must have inspired Christians with an aversion to images or pictures of the Saviour. Gradually, however, as paganism disappeared, the time removed C. further from his people, this feeling would subside, and the longing would arise to possess some representation of him on which the eye might rest with pious delight. When Christian art originated we cannot precisely say; it is usually dated from the time of Constantine. Nevertheless—as Lord Lindsay remarks, in his "Sketches of the History of Christian Art" (Lond. 1847)—"it would be more correct to say that it then first emerged above ground; its earliest efforts must be sought for in the catacombs." In these subterranean excavations, forming a maze of unknown extent and labyrinthine intricacy, to which the Roman Christians had recourse in the days of persecution, are to be found the first traces of Christian sculpture and painting. The *sarcophagi* of the martyrs and confessors, of the heroes and the heroines, of the bishops, and, in gen-

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eral, of those of higher mark and renown, were painted over with the symbols and devices of Christianity. The parables were the chief source from which these sepulchral artists drew their symbols. C. is painted as the good shepherd in the midst of his flock, or, with "pastoral pipe," seeking the lost sheep, or returning with it on his shoulders. Sometimes he figures as an ideal youth in the bloom of his years, sometimes as a bearded man in the prime of life, sometimes as Orpheus surrounded by wild beasts enrapt by the melody of his lyre. Such pictures, however, were only *symbolical*, and did not satisfy the religious craving for a *portrait*. The age of Constantine marks the transition from the symbolical to the *pseudo-historical* picture. We now find C. represented in the midst of his disciples, or in the act of performing a miracle; but it is not till about the close of the 4th c. that we actually encounter that type of countenance which, with certain modifications, continue to rule the conceptions of artists during the whole of the middle ages. To vindicate this type, myths, at a later period, sprang into existence; and we read of a portrait of C. possessed by King Abgarus of Edessa, and imprinted on a handkerchief, and of another miraculously obtained by St Veronica at the Crucifixion; but there is as little foundation for these legends as for that which attributes to the evangelist Luke such a picture. The emperor Alexander Severus (230 A. D.) is said to have possessed in his palace an image of Christ. An Antique mosaic, probably of the 3d c., which exists in the *Museo Christiano* of the Vatican—where are to be found also some specimens of the frescoes of the catacombs—gives an idea of the manner in which the heathen artists expressed their notion of Christ. He is depicted as a bearded philosopher in profile. A letter which Lentulus, the predecessor of Pilate, is declared to have written to the Roman senate, but which is evidently apocryphal, attributes to C. a figure and countenance of manly beauty. Towards the middle of the 8th c., John of Damascus gives a description which he pretends to have gathered from more ancient authors. According to him, C. was tall, had beautiful eyes, but the eyebrows meeting; a regular nose, flowing locks, a black beard, and a sandy or straw-colored complexion, like his mother. Among the most ancient representations of C. which profess to be portraits, are the two paintings in the Calixtine and Pontine catacombs near Rome, and which are given in Arighi's "Roma Subterranea Nova." The Saviour is there represented with an oval visage, a straight nose, arched eyebrows, and high forehead. The expression is earnest and mild; the hair is parted on the forehead, and falls over the shoulders in wavinglocks; the beard is short and scattered. These two busts agree with the apocryphalletter of Lentulus, and the artist or artists who executed them, may possibly have employed it as a model. The majority of the Byzantine and Italian painters, down to the age of Michael Angelo and Raphael, adhered to this type.

CHRIST or Cris Cross Row, the alphabet arranged in the form of a cross, for the use of children; and so printed, in old "horn" books or primers. The letter A was at the top, and Z at the foot of the cross.

CHRI'STCHURCH, a parliamentary and municipal borough and seaport on the English Channel, in Hampshire, at the head of the estuary formed by the Avon and Stour, 24 m. S.W. of Southampton. It has manufactures of fusee chains for clocks and watches, and of hosiery. It has also a salmon-fishery. The priory church, one of the most interesting and magnificent of English ecclesiastical structures, dates from the reign of William Rufus, and was restored in 1861. A battery of artillery is generally stationed in the commodious barracks. The borough comprises two favorite watering-places, Mudeford and Bournemouth. There are traces here of a Roman temple to Mars. Pop. (1871) 15,415. It returns one member to parliament.—C. Bay has a double tide every 12 hours.

CHRISTCHURCH, capital of the province of Canterbury, in New Zealand, situated on the river Avon, about 8 miles from the sea. Its port is Littleton, with which it is connected by a railway, and it is in railway communication with the north and south. It is the centre of a great grazing district, and has also flourishing manufactories. There is a large export trade, chiefly in timber and wool. The city possesses numerous fine public buildings, churches, theatre, &c. Pop. (1875) 10,294; of electoral district, 13,000.

CHRIST-CHURCH, The Cathedral of, (Oxford). This great society has had three distinct foundations. In 1526, Cardinal Wolsey obtained from Clement VII. a

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bull for the suppression of 22 monasteries, the site of one of which he selected as the site of a new college, to be called Cardinal College, and which he intended to endow on a scale of magnificence beyond that of any other foundation in Oxford. On the fall of Wolsey in 1529, the whole establishment came into the hands of King Henry VIII. In 1532, that prince refounded it under the name of King Henry VIII.'s College, and in 1546, he once more re-established the college, under the name of "Christ-Church Cathedral in Oxford, or the Foundation of King Henry VIII., with a dean and 8 canons, 60 students, 40 school-boys, clerks, choristers," &c. This foundation is now subsisting, though it has undergone considerable modifications. To none of the canonries were any duties assigned by King Henry VIII. From time to time, however, the canonries have been annexed to various university professorships, more particularly one to the professorship of divinity, by King James I.; one to the professorship of Hebrew, by King Charles I.; and one to the professorships of ecclesiastical history and pastoral theology respectively, by Queen Victoria.

Several changes were introduced by the commissioners appointed under 17 and 18 Vict. c. 81. There is now only one sinecure-enjoying canon. When he is off the list, no one may hold a canonry save a professor, the archdeacon, or the sub-dean. The studentships are now eighty in number, and are, as before, divided into junior and senior studentships, differing considerably as to emolument. All these are now open, the old system of appointment by nomination having been abolished. About three junior students are elected every year in Lent term, one in every three for excellence in mathematics or physical science; and besides these, three are sent up yearly from Westminster. The senior studentships are also open, with the usual limitation of independent income. Of these, however, only a third can be held by laymen. The studentships were very poor; but an improvement in this respect has been included among the recent changes. Some valuable exhibitions, however, and 90 benefices are in the gift of the society. In 1875, there were about 1150 names on the college books. No statutes were given to C., owing to the death of the king having taken place shortly after the final foundation of the college. It was, in consequence, entirely governed by the orders of the dean and chapter, to the total exclusion of the tutors. To this separation of the governing from the teaching body, as well as to the small value of the studentships, may be ascribed, in great measure, the inconsiderable degree of success in the schools, which, for many years past, brought no small discredit on this magnificent society.

CHRI'STENING, a term often used as equivalent to Baptism (q. v.). It is disliked by some, and, of course, liked by others, as favoring the doctrine of baptismal regeneration; being, indeed, according to its derivation, expressive of the notion that a person is *made a Christian* in baptism. But, like many other terms, it is frequently employed without reference to its origin, and without any intention of conveying the opinion which it might be held strictly to imply.

CHRI'STIAN II., king of Denmark, Norway, and Sweden, born at Vyborg, in the island of Funen, 2d July, 1481. He ascended the throne of Denmark in 1513. Shortly after his marriage, in 1515, with a sister of the Emperor Charles V., a young Norwegian peasant-girl, with whom C. was in love, died, or, as it was believed, was murdered. That natural ferocity for which C. was surnamed the "Angry," burst forth most furiously on this occasion. He caused the governor of the castle, Torben Oxe (see DYVEKE) to be beheaded. He afterwards declared open war against Sweden, took Stockholm through fraud, and had himself crowned king. But the cruel vengeance and treachery of C. after this event excited the indignation of that country, which, headed by Gustavus Wasa (q. v.), succeeded in driving out the Danes, liberating itself from the yoke of the House of Kalmar, and finally electing Gustavus Wasa (in 1523) to the throne. In Denmark, too, the aristocracy had risen, and an insurrection in Jütland following, C. found himself forced to flee for refuge to the Netherlands, and his uncle, Frederic I. (q. v.), the introducer of the Reformation into Denmark, elected king in his place. Encouraged, however, by the Catholic party in the Netherlands, and assisted by Charles V., C. landed successfully in Norway, in 1531; but at the battle of Aggerhuus, in 1532, he was totally defeated, and made prisoner in the castle at Sonderburg, from which he was liberated after twelve years of confinement. He died 28th January, 1559.

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CHRISTIAN IV., king of Denmark and Norway, and Duke of Schleswig-Holstein, born in Zealand, 12th April 1577, and elected successor to the throne in 1580. He assumed the sceptre in 1593. From 1610 he carried on a successful war, known as the Kalmarian war, against Charles IX. of Sweden, and his successor, Gustavus Adolphus, which ended in an advantageous peace in 1613. As leader of the Protestants in the Thirty Years' War, C. was not successful. His labors for the improvement of his country, in which he was indefatigable, were, however, most beneficial. He strengthened its maritime power; extended its commerce as far as the East Indies, where he obtained the first possessions; and by restrictions upon the Hanse towns, greatly increased the inland trade of the country. His legislative and financial reforms, together with his love and patronage of the arts and sciences, gained for him the esteem of his people, especially of the learned. He died in 1648.

CHRISTIAN VII., king of Denmark, son of Frederick V. and Louisa of England, born 29th January 1749. He succeeded to the throne of his father 14th January 1766, and in the same year married Caroline Matilda, sister of George III. of England. The dissipations of his early life had enfeebled his energies, and rendered him unfit for government. The management of the state was, in consequence, seized by his ministers, with Count Bernstorff, who had possessed the entire confidence of the king's father, at their head. Bernstorff, however, was soon forced to retreat before Struensee (q. v.), who exercised unbounded influence over the king and his imprudent young queen. But innovations of a despotic tendency, and insults offered to the national feeling, soon drew upon this minister the hatred the nation. The queen-dowager seeing this, made it an occasion for satisfying her ambitious nature, by attaching herself to the malcontents; and in 1772 she succeeded, with the assistance of her son, Frederick (b. 1754, d. 1805), in persuading the vacillating king to draw up an order of arrest for Struensee and the young queen. Bernstorff was recalled from Hamburg. The king, who was now incapacitated by mental disease, governed only nominally. In 1784, his son, Frederick VI. (q. v.), came to the head of the government, as joint regent with the queen-mother. C. died 13th March 1808.

CHRISTIAN BURIAL. See BURIAL and FELO DE SE.

CHRISTIAN CHARITY, Knights of the Order of, in France. King Henry III. having instituted the order of the Holy Ghost for princes and persons of distinction, founded the order of C. C. for the support of maimed officers and soldiers who had done good service in the wars. He assigned revenues to the order, drawn from all the hospitals in the kingdom. The knights wore on the left breast an anchored cross embroidered on white taffety or satin, with a bordeur of blue silk, and in the middle of the cross a lozenge of sky blue charged with a *fleur de lis or*. The completion of the institution was reserved for Henry IV., who placed it under the charge of the marshals and colonels of France; and by means of it, many of those who had served their country faithfully were enabled to spend the latter portion of their lives in peace and above want. The order formed the germ of that noble hospital, the *Invalides*, which was founded by Louis XIV., and which served as a model for our own hospitals of Chelsea and Greenwich. When the Invalides was founded, the order of C. C. was superseded.

CHRISTIAN CONNECTION, a denomination of Christians which originated about the beginning of the 19th c. in the United States of America, and is diffused over all the states. The name was assumed in avowed dislike to the acknowledgment of any human authority and to sectarian distinctions, and all doctrinal terms of communion were rejected, the Bible being adopted as the only rule of faith, and personal piety made the test of qualification for membership. The Connection soon came to consist, however, almost exclusively of persons denying the divinity of Christ.

CHRISTIAN KNOWLEDGE, Society for Promoting, one of the great religious associations connected with the Church of England, and the oldest of them all. It was founded in 1698, although it did not receive its present name till 1701; and had for its object: "1. To promote and encourage the erecting of charity schools in all parts of England and Wales. 2. To disperse, both at home and abroad, Bibles and tracts of religion; and, in general, to advance the honor of God, and the good of

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mankind, by promoting Christian knowledge, both at home and in other parts of the world, by the best methods that should offer." These objects it has never ceased to pursue, chiefly directing its efforts to the British dominions; partaking at once of the nature of an educational association, a Missionary Society, a Bible Society, and a Religious Tract Society; and notwithstanding the operations of other great societies in these several departments of Christian benevolence, its revenue amounts to about £100,000 a year. The Protestant missionaries who labored in the South of India in last century, were supported chiefly by this society, which has also contributed largely of its funds for the establishment of Christian schools in that country.

CHRISTIAN NAME. See NAME.

CHRISTIA'NIA, capital of Norway, is situated in the province of Aggerhuus, in a beautiful open valley on the northern side of the Christiania Fiord. Pop. (1875) 77,041. C. is the seat of the Norwegian government, the superior courts, and the *Storthing*. Besides the suburbs of Pipervigen, Hammarsborg, Vaterland, and Groenland, the town consists of C. properly so called (which was laid out by Christian IV. in 1614, in the form of a regular parallelogram of 1000 paces in length and breadth); the Old Town or Opslo, where the bishop resides; and the citadel Aggerhuus, from which the broad straight streets of the town can be fired upon. The most important public buildings are the royal palace, the bank and exchange, the house of representatives or Storthing, the governor's palace and the cathedral. To these may be added the university, the only one in Norway, which was opened in 1813, and possesses a staff of 41 ordinary, and 6 extraordinary professors. About 800 students attend it annually. This institution contains, besides various scientific collections, a library of about 150,000 books, a botanical garden, and an observatory (in 59° 54′ 42″ n. lat., and 10° 50′ e. long.). The latter was opened in 1833. C. has also some good schools and learned societies, of which the "Society of Northern Antiquities" is famous. The manufactures of C. are cotton, oil, paper, soap, and bricks. There are also numerous distilleries and cornmills. It exports in considerable quantities wood, iron, anchovies, and glasswares. In 1871, 1894 vessels of 262,853 tons entered the port (which, however, is covered with ice for four months.) It has a regular steam-boat communication with Gottenburg, Copenhagen, Kiel, Hull, and Leith. C., by means of its bay, is connected with Drammen (pop. 18,838), famous for its extensive trade in timber, &c. The scenery of the whole bay is unsurpassed in beauty.

CHRISTIA'NITY. It is proposed in the present article to give a very brief outline of the system of the Christian religion, and of the evidences by which its truth is established. The principal parts, both of the system and evidences of C., will be found noticed under separate heads.

C. comes to us with a claim to be received as of divine origin. It is no product of the human mind, but has for its author the Being whom it sets before us as the object of worship. It is consequently altogether exclusive; it claims to be deemed the only true religion—"the truth"—and admits of no compromise or alliance with any other system.

C. cannot be viewed as distinct from the religion of the Jews and of the patriarchs; it is the same religion accommodated to new circumstances; there has been a change of *dispensation* only. In studying either the system or the evidences of C., we are compelled continually to revert from the New Testament to the Old, and must in some measure trace the history of the true or revealed religion through the previous and preparatory dispensations.

The whole system of C. may be regarded as having its foundation in the doctrine of the Existence of one God. See GOD. Next to this may be placed the doctrine of the Fall (q. v.) of Man. Man is represented as involved in misery by sin (q.v.)—*original* and *actual*—and every individual of the human race as incapacitated for the service and fellowship of God, obnoxious to the displeasure of God, and liable to punishment in a future and eternal state of being. See PUNISHMENT, FUTURE. And here we may regard the doctrine of the ATONEMENT (q. v.) as next claiming our attention—a doctrine taught in all the sacrifices (see SACRIFICE) of the patriarchal and Jewish dispensations, as well as by the words of inspired teachers. Man being utterly incapable of effecting his own deliverance from sin and misery, God sent

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his Son to save sinners, to deliver them from hell, to make them holy, and partakers of the eternal joy and glory of heaven.

☞ By those who regard Christ as a mere creature, *atonement* or *reconciliation* with God is made to depend on the repentance of man as its immediate cause; whilst the life and death of Christ are represented as merely an example to us of obedience, virtue, and piety under the most trying circumstances; the doctrines of a propitiatory sacrifice, a substitutionary obedience, and an imputed righteousness, with all that form part of the same system, falling completely and even necessarily to the ground. These doctrines, however, are all consistently maintained in connection with the doctrine of the Trinity and the generally received doctrine as to the person of Christ. See CHRIST and TRINITY. The very incarnation (q. v.) of the Son of God is regarded as a glorious display of the divine condescension, and a wonderful exaltation of human nature: whilst a personal enjoyment of the highest dignity and bliss of which humanity is capable in the favor and fellowship of God for ever, is to be attained by faith in Jesus Christ. See FAITH and JUSTIFICATION.

The indissoluble connection between faith and salvation arises from the divine appointment, but secures a moral harmony, as it provides for bringing into operation—in accordance with the intellectual and moral nature of man—of most powerful and excellent motives for all that is morally good, the partakers of salvation being thus fitted for the fellowship of Him into whose favor they are received; and as it prevents the possibility of any of them taking to themselves, or giving to others, the glory of that salvation which they really owe to Christ, and which they must therefore ascribe to Christ, as God is a God of truth, and truth must reign in the kingdom of heaven.

Salvation is ascribed by all Christians to the grace of God. The mission of Christ was an act of supreme grace; and all must be ascribed to grace for which we are indebted to Christ. The doctrine of grace, however, is a part of the system of C. on which important differences subsist, especially as to the relation of the grace of God to individual men. Such are the differences concerning ELECTION (q. v.), and concerning the origin of faith, and man's ability or inability to believe of himself. But by Christians generally, the personal relation of the believer to Christ, and his faith in Christ, are ascribed to the Holy Ghost or Spirit of God, the third person of the Godhead, and so to the grace of God. See ARMINIUS, CALVINISM, and PELAGIUS.

In the view of all who hold the doctrine of the Trinity, the doctrines concerning the Spirit of God form a very important part of the Christian system. To the agency of this person of the Godhead, besides all that is ascribed to him concerning the human nature of Christ, we are indebted for all that is spiritually good in man; He, in the economy of grace, being sent by God, on the intercession of Christ, to communicate the blessings purchased by Christ in his obedience and death. See HOLY GHOST.

Salvation begins on earth; and whenever a man believes in Christ, he is a partaker of it—is in a state of salvation. It forms an essential part of the Calvinistic system, that he who is in a state of salvation always remains so, and that the salvation begun on earth is in every case made perfect in heaven. SEE PERSEVERANCE OF SAINTS. Thus salvation is viewed as beginning in REGENERATION (q. v.), and as carried on in SANCTIFICATION (q. v.), and all its joys as connected with the progress of sanctification. Faith in Jesus Christ cannot be unaccompanied with repentance, and repentance is always renewed when the exercise of faith is renewed. For although all believers are *saints* or *holy*, as set apart to God, and in contrast to what they previously were, yet there is none in this life free from temptation and sin; the successful tempter of our first parents, who assailed our Saviour with temptation and was defeated, being still the active enemy of men, against whom believers in Jesus Christ are called to contend, to watch, and to pray. See DEVIL. The sense of responsibility belongs to human nature; and the doctrine of a Judgment (q. v.) to come may be considered as to a certain extent a doctrine of natural religion, as may also that of the Immortality (q. v.) of the soul; but the clear and distinct enunciation of these doctrines belongs to the Christian revelation, to which belongs entirely the doctrine of the Resurrection (q. v.) of the Dead.

Of the moral part of C., which has already been referred to, it may be sufficient here to state, that it is as harmonious with the doctrinal as it is inseparable from it;

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that it is founded upon the attributes of God, and is perfectly illustrated in the character of Jesus Christ; and that it is divisible into two great parts—one, of the *love of God*, and the other, of the *love of man*, or of ourselves and our neighbors See LAW, MORAL.

The *means of grace*, or of the attainment of the blessings of salvation, form an important part of the Christian system. Of these the WORD OF GOD—or divine revelation contained in the Bible (q. v.)—first claims attention, as the means of *conversion* to Christ, and of *edification* in Christ, the instrument by which salvation is both begun and carried on in men. The ordinances of God's worship are among the means of grace. Thus Prayer (q. v.) is one of the chief means of grace. The Sacraments (q. v.) are means of grace, concerning the precise use of which, and their relative importance as compared with the other means, considerable difference of opinion prevails among Christians. The same remark applies also to the combination of Christians into an organised body or community, the Church (q. v.) with its own laws or system of church-government (q. v.) and church-discipline (q. v.)

We have endeavored to sketch the outline of the system of C., as much as possible according to the general belief of Christians, merely indicating the points on which the chief differences of opinion exist. Some of the principal controversies will be found noticed under separate heads.

The truth of C. is established by many different *Evidences*, distinct and independent, but mutually corroborative. It appeals to reason, and demands to have its claims examined and admitted. Nor is there any *faith* where there is not a mental conviction arrived at by a process of sound reasoning.

The evidences of C. are very generally divided into two great classes, *internal* and *external*—the former consisting of those which are found in the nature of the Christian system itself, and in its adaptation to the nature and wants of man; the latter, of those which are derived from other sources. The boundary between the two classes, however, is by no means so distinct in reality as it appears in the definition of the terms. Of the multitude of books which have been written on the subject of the evidences of C., some are devoted mainly to one of these classes, and some to the other; whilst some are occupied with the development of particular evidences or arguments, and some with the refutation of objections, and in particular of what may be called a preliminary objection—that a divine revelation can never be established by sufficient evidence at all. See REVELATION.

The evidence of Miracles (q. v.) and the evidence of Prophecy (q. v.), two of the principal branches of the external evidences of C., will be found noticed in separate articles. Another argument, which has been much elaborated—for example, in Paley's "Evidences"—is derived from the character and sufferings of the apostles and other first preachers of C.; their high moral worth, considered along with their great earnestness and devotedness; the absence of all possibility of selfish or base motives; and at the same time, their perfect opportunity of knowing the truth of the facts which they proclaimed. A subsidiary argument is found in the admission of the great facts regarding Jesus of Nazareth, by the early opponents of Christianity. A most important and valuable argument is found in the perfect coherence of all the parts of the Christian system, and in the agreement, as to the religion which they teach, of all the books of Scripture, notwithstanding the widely different dates of their composition, and their very different nature in other respects. See BIBLE. The relation of the Jewish ceremonies to the doctrines of C. supplies another argument of this kind, capable of being developed in a multitude of particulars. The minor coincidences between the different books of Scripture have been pointed out with happy effect in the "Horæ Paulinæ" of Paley, and in other works. The character of our Saviour supplies an argument of great power: the impossibility of the invention of such a character, and of the history in which it is exhibited, by any effort of human genius, is also urged as corroborative; and the inconsistency of the morality displayed, with the supposition of imposture, has been dwelt upon with the same view. The excellency, both of the doctrinal and moral part of the system of C., its elevating and purifying tendency, the agreement of its doctrine with the facts of man's sinfulness and misery, and the suitable provision which it makes for his most deeply felt wants, are principal branches of the internal evidence of its truth. The effects of C., where it has prevailed, supply a

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confirmatory argument in its favor, which has formed the subject of works of great learning and interest.

CHRI'STIANSAND, the principal town of the province or *stift* of that name in Norway, is situated at the mouth of the Torridalself, in the bay of Christiansand. Pop. (1875) 12,187. C. is the residence of a bishop and high-bailiff or stift-amtmand and possesses a branch of the Norwegian Bank, a gymnasium, and several charitable foundations. The manufactures are leather, tobacco, cotton, &c. Ship-building forms also a considerable branch of its industry. The town, which was built in 1641 by Christian IV., has an excellent harbor, divided into two parts by the island of Oddern, upon which are situated the quarantine hospital and custom house. C. exports wood, lobsters, and salmon in large quantities. The town and harbor are protected by several fortifications. To the west of C. lies the harbor of Ny-Hollesund.

CHRI'STIANSFELD, a settlement of Moravian brothers, in the northern part of Schleswig, was founded in 1772. It consists of 64 houses and about 700 inhabitants. The houses, which are well built, and cheerful in appearance, are arranged in two parallel streets, with the church upon a green plot in the middle. The settlement is represented by the inspectors or chiefs appointed by the directors of the fraternity, and the representatives elected by the members of the sect. The manufactures are linen, soap, cotton, leather, &c.

CHRI'STIANSTAD, the strongly fortified capital of a province of the same name in the south of Sweden. It is situated on the Helge, about 9 miles from the Baltic, and 265 south-west of Stockholm. C. is the residence of a governor, and the seat of a court of justice. It is a beautifully built town, and possesses an arsenal, a school, a magnificent church, and a senate-house. Pop. 6422, employed chiefly in the manufacture of woollen goods, leather, gloves, &c. There is also some trade in wood, pitch, potash, &c. The town, which was founded by Christian IV., has suffered many sieges during the wars between Denmark and Sweden. The province of Christianstad has an area of 2400 miles; pop. (1875) 229,176.

CHRI'STIANSTED, the chief town of the Danish island of St Croix, in the West Indies. It stands on the north-east coast of the island, and has an excellent harbor, which is defended by a fort and a battery. Here resides the governor-general of the Danish West Indies. The number of its inhabitants is 5700.

CHRISTI'NA, queen of Sweden, only child of the Great Gustavus Adolphus, was born December 1626, and succeeded her father in 1632, when only six years old. Distinguished equally by beauty and the possession of a lively imagination, a good memory, and uncommon intelligence, she received the education rather of a man than of a woman; and to this may in part be attributed the many eccentricities of her life. During her minority, the kingdom was governed by the five highest officers of the state, the principal being Chancellor Oxenstiern. In 1644, she assumed the reins of power, and, in 1650, was crowned with the title of *king*. She had previously declared her cousin, Charles Gustavus, her successor. For four years thereafter, she ruled the kingdom with vigor, and was remarkable for her patronage of learned and scientific men. In 1654, however, at the age of 28, weary of the personal restraint which royalty imposed on her, she abdicated in favor of her cousin, reserving to herself sufficient revenues, entire independence, and supreme authority over her suite and household. Leaving Sweden, she proceeded to Brussels, where she embraced the Roman Catholic religion. She afterwards went to Rome, which she entered on horseback, in the costume of an Amazon, with great pomp. Confirmed by Pope Alexander VII., she adopted the surname of Alessandra. In 1656, she visited Paris; and the following year, on a second residence there, she caused her grand equerry, Monaldeschi, who had enjoyed her entire confidence, to be executed in her own household for treason. In 1658, she returned to Rome, and, in 1660, the death of the king, her cousin, caused her to hasten to Sweden; but, failing in her attempt to be re-instated on the throne, she again left the country. In 1666, she aspired to the crown of Poland, but was unnoticed by the Poles. The remainder of her life was spent at Rome in artistic and scientific pursuits. Besides founding an academy she collected valuable MSS., medals, and paintings, and died April 19, 1689. Much of her conduct favors the idea that at times she was scarcely sane.

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CHRISTINA, queen of Spain. See MARIA CHRISTINA.

CHRI'STISON, Sir Robert, D.C.L., an eminent physician, son of Alexander Christison, Professor of Humanity in the university of Edinburgh, was born at Edinburgh, July 18, 1797; was educated at the High School of his native place, and, in 1811, became a student at the university there. After graduating in 1819, he proceeded to London and Paris; and, in the French capital, studied toxicology under the celebrated Orfila, a department of medical science in which in Britain his name has become eminent. Commencing the practice of medicine at Edinburgh, he was, in 1822, appointed Professor of Medical Jurisprudence in the university of that city, and, in 1832, was promoted to the chair of Materia Medica. Besides contributing papers on various subjects to medical journals, C. is author of a "Treatise on Poisons," published in 1829, recognised as a standard work on the subject; "Biographical Sketch of Edward Turner, M.D.," 1837, being an address delivered before the Harvelan Society of Edinburgh; a treatise "On Granular Degeneration of the Kidneys," 1839; and "The Dispensatory, a Commentary on the Pharmacopœias of Great Britain," 1842. Twice President of the Royal College of Physicians, Edinburgh, and Ordinary Physician to the Queen in Scotland, in 1871 he was created a baronet. In 1877 Sir Robert retired from professorial and other public work.

CHRI'STMAS, the day on which the nativity of the Saviour is observed. The institution of this festival is attributed by the spurious Decretals to Telesphorus, who flourished in the reign of Antoninus Pius (138—161 A.D.), but the first certain traces of it are found about the time of the Emperor Commodus (180—192 A.D). In the reign of Diocletian (284—305 A.D.), while that ruler was keeping court at Nicomedia, he learned that a multitude of Christians were assembled in the city to celebrate the birthday of Jesus, and having ordered the church-doors to be closed, he set fire to the building, and all the worshippers perished in the flames. It does not appear, however, that there was any uniformity in the period of observing the nativity among the early churches; some held the festival in the month of May or April, others in January. It is, nevertheless, almost certain that the 25th of December *cannot* be the nativity of the Saviour, for it is then the height of the rainy season in Judea, and shepherds could hardly be watching their flocks by night in the plains.

C. not only became the parent of many later festivals, such as those of the Virgin, but especially from the 5th to the 8th c., gathered round it, as it were, several other festivals, partly old and partly new, so that what may be termed a *Christmas Cycle* sprang up, which surpassed all other groups of Christian holidays in the manifold richness of its festal usages, and furthered, more than any other, the completion of the orderly and systematic distribution of church festivals over the whole year. Not casually or arbitrarily was the festival of the Nativity celebrated on the 25th of December. Among the causes that co-operated in fixing this period as the proper one, perhaps the most powerful was, that almost all the heathen nations regarded the winter-solstice as a most important point of the year, as the beginning of the renewed life and activity of the powers of nature, and of the gods, who were originally merely the symbolical personifications of these. In more northerly countries, this fact must have made itself peculiarly palpable—hence the Celts and Germans, from the oldest times, celebrated the season with the greatest festivities. At the winter-solstice, the Germans held their great Yule-feast (see YULE), in commemoration of the return of the fiery sun-wheel; and believed that, during the twelve nights reaching from the 25th December to the 6th January, they could trace the personal movements and interferences on earth of their great deities, Odin, Berchta, &c. Many of the beliefs and usages of the old Germans, and also of the Romans, relating to this matter, passed over from heathenism to Christianity, and have partly survived to the present day. But the church also sought to combat and banish—and it was to a large extent successful—the deep-rooted heathen feeling, by adding—for the purification of the heathen customs and feasts which it retained—its grandly devised liturgy, besides dramatic representations of the birth of Christ and the first events of his life. Hence sprang the so-called "Manger-songs," and a multitude of C. carols, as well as C. dramas, which, at certain times and places, degenerated into farces or Fools' Feasts (q. v.). Hence also originated, at a later period, the Christ-trees, or C.-trees, adorned with lights and gifts, the custom of reciprocal presents,

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and of special C. meats and dishes, such as C. rolls, cakes, currant-loaves dumplings, &c. Thus, C. became a universal social festival for young and old, high and low, as no other Christian festival could have become.

In the Roman Catholic Church, three masses are performed at C.—one at midnight, one at daybreak, and one in the morning. The day is also celebrated by the Anglo-Catholic Church—special psalms are sung, a special preface is made in the Communion Service, and the Athanasian Creed is said or sung. The Lutheran Church, on the continent, likewise observes C.; but the Presbyterian churches in Scotland, and the whole of the English dissenters, reject it, in its religious aspect, as a "human invention," and as "savoring of papistical will-worship," although in England, dissenters as well as churchmen keep it as a social holiday, on which there is a complete cessation from all business. But within the last hundred years, the festivities once appropriate to C. have much fallen off. These at one time lasted with more or less brilliancy till Candlemas, and with great spirit till Twelfth-day; but now a meeting in the evening, composed, when possible, of the various branches and members of a family, is all that distinguishes the day above others.

CHRISTMAS BOX, a small money-gift to persons is an inferior condition on the day after Christmas, which is hence popularly called *Boxing-day*. The term, and also the custom, are essentially English, though the making of presents at this season and at the new year is of great antiquity. A number of interesting particulars concerning the C. B. will be found in Brand's "Popular Antiquities." Here, we need refer only to the usage in its later aspect. Within the memory of middle-aged persons, the practice of giving Christmas boxes, or petty presents, to apprentices, domestic servants, and tradesmen, had become a serious social nuisance, more particularly in London, where every old custom seems to linger, and is most difficult to be got rid of. House-holders felt under an obligation to give money to the apprentices in the shops where they dealt, also to various inferior parish officers, including scavengers and lamplighters; while shopkeepers, on the other hand, were equally impelled to make presents to the male and female servants of their customers. Thus, as referred to in "Christmas," a poem:

> "Gladly, the boy, with Christmas Box in hand,
> Throughout the town his devious route pursues;
> And, of his master's customers, implores
> The yearly mite: often his cash he shakes;
> The which, perchance, of coppers few conclists,
> Whose dulcet jingle fills his little soul
> With joy."

At length the C. B. system became such an intolerable grievance, that tradesmen stuck up notices in their windows that no Christmas boxes would be given; and at the same time the public authorities issued remonstrances to the same effect. At Christmas 1836, the Secretary of State for Foreign Affairs issued a circular to the different embassies, requesting a discontinuance of the customary gifts to the messengers of the Foreign department, and other government servants. Since this period, the practice has greatly decreased, doubtless to the improvement of the self-respect of the parties interested.

CHRISTMAS-CAROLS. The word carol (Ital. *carola*, and Fr. *carole*, a round dance—probably from Lat. *corolla;* Welsh, *coroli*, to reel, to dance; the name is thence applied to the music or song accompanying such a dance: *carillon* is probably allied) signifies a song of joy. The practice of singing carols, or, at all events, sacred music, in celebration of the nativity of Christ as early as the 2d c., is considered as proved by the circumstance that a large sarcophagus belonging to that period has sculptured upon it a representation of a Christian family joining in choral praise for this purpose. A century or two after this, however, the C. C. seem to have sadly degenerated, and become, in fact, so indecent, that the clergy found it necessary to forbid them. Under the Anglo-Saxon kings, merriment and piety were pleasantly combined in English life, a peculiarity that effected the C. C. of that period not a little; but by the 13th c. the jocosity had unhappily lapsed into what would now be considered profanity. The oldest printed collection of English C. C. bears the date of 1521. The majority of these, though written by men of learning—priests and teachers—exhibit a lament-

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able ignorance of the character of the two most prominent persons in the carols—Mary and Jesus. In 1525 was kept the "still Christmas," on account of the illness of King Henry; but with this exception, the sacred season appears to have been regularly celebrated with joyous music and songs during the Tudor period. In 1562, C. C. of a more solemn nature were introduced. By the Puritan parliament, Christmas was abolished altogether, and holly and ivy were made seditious badges; and in 1630 the Psalms, arranged as carols, were advertised. After the Restoration, the C. C. again exhibited a hearty, cheerful, and even a jovial character. Those with which the dawn of Christmas is now announced in England are generally religious, though not universally so. In France, the carols at this season used to be much less sacred than gay. Often, indeed, they were grossly Bacchanalian.

See an interesting paper in the "Athenæum" for December 20, 1856; also Sandys's "Christmas Carols," 8vo, 1853; Sylvester's "Christmas Carols and Ballads."

CHRISTMAS ROSE. See HELLEBORE.

CHRISTO'LOGY is the doctrine of the Person of Christ. The word itself is to be found, once or so, in the divines of the 17th c. (see Dean Trench on the "Study of Words," but the department of scientific theology which it now represents is almost entirely the growth of modern, and particularly of German inquiry. As yet it can hardly be said that the word C. is accredited in Great Britain, but the same differences of opinion which led to its adoption in Germany, are beginning to manifest themselves here also. There are only three methods of apprehending the doctrine of the Person of Christ. First there is the *Rationalistic* method. This consists in representing the development of the Messianic idea in Jewish history as purely natural, and conditioned by purely human and historical influences—in short, as a subjective or self-originated notion, to which there was no correspondent Divine Reality. Second, there is, what, for want of a better word, we may call the *Spiritualistic* method (that of theologians like Neander, Rothe, &c.). This consists in representing the development of the Messianic idea in Jewish history as both natural and supernatural; that is to say, it asserts the existence of a Divine Objective Reality ("the Eternal Son of God") as the basis of the subjective idea in the minds of the Jews, and regards the growth of that idea, and the influence of historical circumstances, as the result of a supernatural Providence, which culminated in the revelation "of the mystery of godliness, God manifest in the flesh." Third, there is the *Dogmatic* method, which is the one accepted by the common order of theologians. This consists in representing the doctrine of the Person of Christ as *symbolically* known to the spiritually-minded among God's people from the earliest ages. "Abraham saw his (Christ's) day afar off." This is interpreted to signify that, by the grace of prophetic illumination, the righteous men of old were enabled to foresee in a mysterious and inexplicable manner the atonement of Christ, as it happened in history. Admitting with the Spiritualistic theologians, that the Messianic idea among the Jews underwent, in some sense, a historical development, the dogmatic Christologists differ, in general, from the former by attributing to the higher minds such a knowledge of the *work* of Christ, as logically involves a knowledge of his person and character. The entire absence, however, of any *personal* traits of Christ in the Old Testament, such as might be expected of those who had seen him even with the eye of faith, has induced many orthodox theologians to shrink from making any statement in regard to what may have been the doctrine of the Person of Christ among the ancient Jews.

•CHRISTOPHE, Henri, king of Hayti, born October 6, 1767, was at one period a slave and tavern-cook in Cape Town, St Domingo, and afterwards overseer of a plantation. In 1790, he joined the black insurgents against the French, and, from his gigantic stature, energy, and courage, soon became a leader among them. By Toussaint Louverture, he was appointed brigadier-general, and employed to suppress an insurrection headed by Moyse, or Moses, his nephew. C. captured the latter, and on his execution, succeeded him as governor of the northern province of French St Domingo. In 1802, he gallantly defended Cape Town when General Leclerc arrived there with a French army destined for the reduction of the blacks, and effected his retreat with 8000 men, after having burned the greater part of the town. The perfidious seizure of Toussaint, he amply revenged, and during the short-lived government of Dessalines, who was slain by a military

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conspiracy in October 1806, C. was general-in-chief of the Haytian army. In February 1807, he was appointed President of Hayti for life. A republic being, about the same time, organised at Port-au-Prince, with Petion at its head, civil war commenced between them. On March 28, 1811, C. was proclaimed *king* of Hayti, by the name of Henri I., and solemnly crowned, June 2, 1812. In 1814, he and Petion suspended hostilities, and by his power and skill, C. was enabled to counteract the attempts made by France to regain its authority in the island. His avarice and cruelty led to an insurrection, which was aided by General Boyer, who had succeeded Petion in 1818; and the rebellion having spread to Cape Town, C.'s deposition was proclaimed, at the head of the troops, by the Duke of Marmalade, one of the first dignitaries in the kingdom. Deserted by his body-guard and all his nobles, he shot himself, October 8, 1820. He left a code of laws, which he called the "Code Henri," in imitation of the Code Napoleon.

CHRI'STOPHER, Herb. See ACTÆA.

CHRISTOPHER, St, a saint of the Roman Catholic and Greek churches. He is supposed to have suffered martyrdom about the middle of the 3d century. According to vulgar legend, C., whose name was originally *Adokimos* (the Unrighteous), was a native of Palestine, Syria, or Lycia, and a person of prodigious bulk and strength. His height was 12 feet. So proud was he of his gigantic frame, that he would serve only the mightiest princes. Having attached himself to one, who went for the greatest of his day, C. stayed with him for a short time, but soon discovered that his master was terribly afraid of the devil, in consequence of which, C., with fearless consistency, passed into the service of the latter. One day, however, when the devil and he chanced to be walking through a wood, they came across an image of Christ. His new master exhibited such perturbation and alarm at the sight, that C. entirely lost confidence in him, and resolved to find out the Saviour and follow him. For a long while he searched in vain, but finally he fell in with a hermit, who shewed him Christ, and baptised him. C. despised the customary penances, and in consequence, it was imposed on him to carry Christian pilgrims on his shoulders over a stream which had no bridge. One day, a little child came to the stream; C. took it on his shoulders, but soon began to sink under the weight of his burden. The child was Christ himself, and to prove it, he commanded C. to stick his staff into the ground. He did so, and next morning it had blossomed into a palm-tree bearing fruit. This miracle converted thousands to Christianity. C.'s success excited the enmity of Dagnus, the prefect of that region, who put him in prison, scourged him with red-hot rods, put a burning helmet on his head, and clapped him on a burning stool. C. still remained unhurt. Multitudes of poisoned arrows were now discharged against him, but they rebounded from his charmed body, and one even wounded the prefect himself in the eye. C. pitied his tormentor, and freely offered his head to the executioner, that the prefect might be healed by the blood which should flow from it. This was done, and, as a matter of course, Dagnus and his family became Christians. The Greek Church celebrates his festival on the 9th of May; the Roman Catholic, on the 25th of July.

St C. was greatly invoked in times of pestilence, or when people were digging for treasures, to frighten away the spirits who watched over them. The formula used was called a "Christopher's Prayer." He was also the patron of an Order of Moderation, founded in Austria in 1517, for the purpose of checking excessive drinking and swearing, and which was called the order of St Christopher.

CHRISTOPHER'S, St., or, popularly, *St Kitts*, an island near the north-east bend of the great arch of the Antilles, 46 miles to the west of Antigua, and 2 miles to the north of Nevis. With a very unequal breadth, it is 20 miles long from south-east to north-west, containing about 44,000 acres, and (1871) 28,169 inhabitants. It belongs to Great Britain, and has a legislature of its own, with an executive immediately subordinate to the governor-in-chief of the Leeward group, residing in Antigua. In 1873, the revenue of the colony was £31,458, having been only £3668 in 1834; so that, under the system of free labor, it had increased nearly seven-fold in 39 years. During the same interval, the imports had risen in value from £68,018 to £162,355, and the exports from £105,267 to £179,964. The staple exports are sugar, rum, and molasses. The debt of the island in the year 1873 amounted to £7200. Education is in a promising condition. In the year 1865, there were 27 schools receiving gov-

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ernment aid, attended by 367 pupils in all—11 of the establishments belonging to the Church of England, 8 to the Moravians, and 8 to the Wesleyans.

The chief towns, both of them seaports with open roadsteads, are Basse-Terre, defended by Fort Smith, and Sandy Point, protected by Fort Charles and Brimstone Hill. Of Fort Smith, the exact lat. and long. are 17° 17′ 7″ n., and 62° 48′ w. The mean annual temperature of these places, and of the coast generally, is about 80° F.; but the mornings and evenings, even of the hottest days, are agreeably cool. The length of the island is traversed by a well-wooded range of volcanic origin, which has in its centre a crater; and towards the west extremity of the range, rises the almost perpendicular crag of Mount Misery, with an altitude of 3711 feet above the level of the sea. Over the adjacent slopes, which gradually descend to the water's edge, this central range sends down several streams—almost every numerplantation, in fact, receiving its rivulet in the rainy season. The springs, though ous, are yet mostly brackish; and indeed the southern extremity of the island presents a number of salt ponds.

St Kitts, appropriately named by the natives "The Fertile Isle," was discovered by Columbus in 1493, and colonised by the English in 16.3, who were almost immediately joined by some French adventurers. After treacherously exterminating the Caribs, the French and English, often quarrelling, occupied the island, till, in 1713, the Treaty of Utrecht gave the whole to England. In 1782, during the war of American independence, St. Kitts was captured by the French, but restored. On July 31, 1865, a terrific fire took place at Basse-Terre.

CHRIST'S COLLEGE, Cambridge, was originally founded by Henry VI., under the name of God's House, and was intended by him to consist of a master, 12 fellows and 47 scholars. In 1505, however, there were only three fellows besides the master, when Lady Margaret, Countess of Richmond and Derby, mother of Henry VII., "counting herself, as of the Lancaster line, heir to all Henry VI.'s godly intentions," made up the full number, and endowed the college liberally, changing its name to Christ's College. Edward VI. added one fellow, and three scholars; and Sir John Finch and Sir Thomas Baines increased the number of fellows to fifteen. C. C. possesses many rich benefactions for the encouragement of students, amongst which are especially to be noticed four studentships founded by Christopher Tancred, worth £107 per annum, and tenable for three years after taking the degree of B.A. A student is elected annually before coming into residence. Amongst the illustrious men connected with this college may be noted Bishop Latimer, John Milton, and Ralph Cudworth, author of the "Intellectual System."

CHRIST'S HOSPITAL, Newgate Street, London, was founded on the site of the Greyfriars' Monastery, by Edward VI., June 26, 1553, as a hospital for orphans and foundlings. It is usually called the "Blue Coat School," on account of the dress worn by the boys. This consists of a blue woollen gown or coat with a narrow red-leather girdle round the waist, yellow breeches, and yellow stockings, a clergyman's bands at the neck, and a small blue worsted cap, but this last they seldom wear, and are generally seen going about bareheaded—such has been the costume of the boys since the foundation of the school in the reign of Edward VI.; the persistency in it through successive generations, affording a curious instance of the unchangeableness in some of the English usages. No boy is admitted before seven years of age, or after ten, and none can remain after fifteen, with the exception of "King's boys," (i. e., those who attend the mathematical school founded by Charles II. in 1672), and "Grecians" (i. e., the highest class of scholars in the hospital), of whom 8 are sent on various scholarships to the universities of Oxford and Cambridge. Altogether about 800 boys can be admitted. The right of presentation is vested in the managing governors. These are the lord mayor of London, the aldermen, and 12 common councilmen. Besides these, all noblemen and gentlemen who benefit the hospital to the extent of £400 are governors. The managing governors are the patrons of several churches, chiefly in Surrey and Essex. The most of the income of C. Hs, which amounts to about £50,000, is derived from legacies subsequent to its original charter. King Charles's Foundation enriched it by £7000, with an additional annuity of £370, 10s., for the purpose of educating yearly ten boys for the sea-service. Most of the building perished in the Great Fire of 1666; but, through the generosity of the corporation of London,

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and the liberal help of wealthy Englishmen, it was soon rebuilt, under the superintendence of Sir Christopher Wren. In the course of time, the new hospital fell into decay, and in 1825, a third structure was erected by Mr Shaw. The great hall of the hospital is a magnificent room, second only to that of Westminster. C. H. is essentially a classical institution, Latin and Greek being the basis of education; but, to satisfy the wants arising from the changed condition of society, the modern languages, drawing, &c., are also taught. In 1683, the governors built a preparatory school at Hertford, where the children are trained till they are old enough to enter the hospital. The *girls*, however, remain permanently here. It can receive about 400 of both sexes. Dependent schools in Newgate Street accommodate 1200 children. Several eminent persons have been educated at C. H., such as Camden, Stillingfleet, Coleridge, and Lamb.

CHRIST'S THORN. See JUJUBE and PALIURUS.

CHROMA'TIC, in Music, is a term applied to a series of notes at the distance of a semitone from each other. Such a series is produced by dividing the whole tones of the diatonic scale into semitones, so that with the two diatonic semitones, already in the natural scale, the octave is divided into twelve semitones. The word C. is from the Greek, and means colored. Ascending C. passages are formed by the whole tones of the diatonic scale being raised or elevated by a sharp or a natural, according to key, and descending passages by their being lowered by a flat or a natural. It is usual to speak of the C. scale, but that is wrong, as it is only a melodious progression of semitones, certain notes of which belong to, and form the diatonic scale, shewing that the foundation of the system of music does not rest on a C. basis, but on the natural diatonic progression of sounds.

CHROMATIC, in Optics. See ACHROMATIC.

CHROMA'TICS is that part of the science of Optics (q. v.) which explains the properties of the colors of light and of natural bodies. Before 1666, when Sir Isaac Newton began to investigate this subject, the notions which prevailed respecting the nature of colors was purely fanciful. Till Descartes' time, indeed, it seems not to have been conceived that color had anything to do with light. As examples of the notions prevalent at very early times, we may cite those propounded by Pythagoras and Zeno. According to the former, color was the superficies of bodies; according to the latter, it was "the first configuration of matter"—whatever that may be. It is now settled that white light is not homogeneous, but consists of rays of different colors, endued with different degrees of refrangibility, and that the different colors of bodies arise from their reflecting this or that kind of rays most copiously. According to this, a body that appears red reflects red rays in greater abundance than the others; and one that appears black reflects none of the rays—in other words, absorbs all the light that falls upon it. The analysis of a beam of the sun's light by a prism was the experiment by which Newton demonstrated his great optical discovery of the unequal refrangibility of the variously colored rays, and laid the foundations for the above theory of color. The reader will find an account of this experiment, and of the most interesting phenomena presented by the spectrum, under the article SPECTRUM. Newton concluded from his experiments that white light is composed of seven colors, which he called the primary colors—viz., red, orange, yellow, green, blue, indigo, and violet, and that all other shades of color arise from the admixture of these in different proportions. Sir David Brewster, on the other hand, conceives that he has established that the primary colors are only three in number—red, yellow, and blue. This result he obtained by examining the rays of the spectrum through different absorbing media—a mode of experiment now admitted to be fallacious in principle. Professor Maxwell, by direct examination of the rays, concludes that the three primary colors are red, green, and blue. Recently, a theory has been propounded, that all the colors are the results of the admixture of white light and of shade or darkness; but as yet no attempt has been made to support this theory by direct experiment on the sun's rays. It is rested on results obtained by combining by motion certain proportions of white and pigments on a revolving card. See the articles LIGHT, DISPERSION, and NEWTON'S RINGS.

CHRO'MATYPE (Gr. *chrome*, color; *typos*, impression), a photographic process, thus described by its discover, Mr R. Hunt. One drachm of sulphate of copper is

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dissolved in one ounce of distilled water, to which is added half an ounce of a saturated solution of bichromate of potash; this solution is applied to the surface of the paper, and when dry, it is fit for use and may be kept for any length of time without spoiling. When exposed to sunshine the first change is to a dull brown, and if checked in this stage of the process, we get a negative picture; but if the action of light is continued, the browning gives way and a positive yellow picture on a white ground is obtained. In either case if the paper when removed from sunshine is washed over with a solution of nitrate of silver, a very beautiful positive picture results. In practice it will be found advantageous to allow the bleaching action to go on to some extent; the picture resulting from this will be clearer and more defined than that obtained when the action is checked at the brown stage. To fix these pictures it is necessary to remove the nitrate of silver, which is done by washing them in pure water. If the water contains any chlorides, the picture suffers, and long soaking in such water obliterates it—or if a few grains of common salt be added, the apparent destruction is rapid. The picture is, however, capable of restoration, all that is necessary being, to expose it to sunshine for a quarter of an hour, when it revives; but instead of being of a red color, it assumes a lilac tint, the shades of color depending upon the quantity of salt used to decompose the chromate of silver which forms the shadow parts of the picture. Mr. Bingham suggested the substitution of sulphate of nickel for sulphate of copper, as yielding a higher degree of sensitiveness and greater definition. Neither process has been much used.

CHRO'MIUM (*chrome*, color) is a metal. so called from the many colored compounds it produces. It was discovered by Vauquelin in 1797. C. occurs naturally as the chromate of lead (PbO,CrO_3), and the chromite of iron, *chrome iron ore* (FeO,Cr_2O_3), at Unst and Fetlar in the Shetlands, and Portsoy in Banffshire, &c. The metal has been obtained in powder and in scales, but as a metal it possesses no interest. The principal compound of C. is the bichromate of potash, obtained by heating chrome iron ore in powder with one-fourth of its weight of nitre, and then digesting in water, which dissolves out the chromate of potash (KO,CrO_3), a yellow salt, and when this is acted upon by sulphuric acid, it is converted into bichromate of potash ($KO,2CrO_3$), readily crystallises in orange-red crystals, which is soluble in water, and is largely used by the dyer and calico-printer. If this salt be added to a solution of lead, an abundant yellow precipitate occurs of chromate of lead (PbO,CrO_3), or *chrome yellow*, which is used largely by the painter as a yellow pigment. A sesquioxide of C. (Cr_2O_3), *chrome green*, possessing a bright green color, which renders it useful in enamel painting, and being innocuous, it is now introduced into paper-hangings instead of the highly dangerous arsenical green pigment. The bichromate of potash is employed in conjunction with sulphuric acid as an agent in bleaching palm-oil and other oils and fats.

CHRO'NICLE, (from *chronos*, time), denotes a history in which events are treated in the order of time. A C. is understood to differ from annals in being more connected and full, the latter merely recording individual occurrences under the successive years or other dates. Most of our older histories were called chronicles, such as the "Saxon Chronicle," "Hollingshed's Chronicle." The term is seldom applied to a modern book, but frequently to a newspaper—as, for instance, "The Morning Chronicle."

CHRO'NOGRAM, or Chro'nograph (Gr. *chronos*, time, and *gramma*, a letter, or *grapho*, I write), a whimsical device of the later Romans, resuscitated during the *renaissance* period, by which a date is given by selecting certain letters amongst those which form an inscription, and printing them larger than the others. The principle will be understood from the following C., made from the name of George Villiers, first Duke of Buckingham:

GEORGIVS. DVX. BVCKINGAMIÆ.

The date MDCXVVVIII (1628) is that of the year in which the duke was murdered by Felton, at Portsmouth.

CHRO'NOGRAPH. Different forms of time-measures, or time-recorders, under this designation, have been invented within a recent period.

Benson's chronograph is intended to measure intervals of time down to tenths of

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a second, for use at horse-races and other occasions where a seconds watch is not exactly suited. It has an ordinary quick train lever movement, carrying hands which move over a dial. One of these is a seconds hand, very peculiarly made. This seconds hand is double, consisting of two distinct hands, one superposed on the other. The outer end of the lower-most hand has a small cup with a minute hole at the bottom; while the corresponding end of the uppermost hand is bent over so as exactly to reach this puncture. The little cup is filled with ink, having a consistency between that of writing fluid and printers' ink. Suppose that a horse-race is about to take place. The observer keeps a steady look-out for the fall of the starter's flag, or whatever the signal may be; he gives a pull to a cord or string connected with the mechanism peculiar to the instrument; by this movement, the outer and bent end of the upper seconds hand dips down through the ink-cup in the lower hand, and through the puncture to the dial. A small black spot or mark is thus made upon the dial-plate; and this is repeated as each horse passes the winning-post. If the eye and hand of the operator are quick and accurate, there is a reliable record thus presented by the instrument of the duration of the race, sometimes as close as one-tenth of a second. The instrument is now adopted at the principal races as a suitable one for the purpose; thus it is used for races such as the Derby, the Oaks, the Goodwood, the St. Leger, &c. It is also available for many other purposes.

Strange's chronograph is designed for a more scientific purpose, and constructed with more careful details. The object is to measure extremely short intervals of time, for the determination of longitudes in great trigonometrical surveys. The observer, when a particular star traverses the field of his telescope, touches a small ivory key; and on the instant, a dot or mark appears on a sheet of paper coiled round a barrel. The instrument being connected with an astronomical clock, there is a dot made for every beat of the pendulum; and as these dots are a considerable space apart (considerable, that is, for the refined instruments of the present day), it is possible to determine so wonderfully minute an interval as one hundredth of a second.

Other forms of chronohraph have been adopted by astronomers. One was suggested by Professor C. A. Young in 1866 to assume the functions of a *recording* chronograph, by marking the instant of observation in hours, minutes, seconds, and hundredths of a second, in *printed* characters, and in a form suitable for preservation at reduction.

Chronographs connected with electric and magnetic apparatus are used for determining the velocity of projectiles. Many forms have been devised by Noble, Bashforth, Navez, Le Boulengé, and other inventors. The most general arrangements consists in causing the bullet to pass through a series of screens; the rupture of each screen breaks for a moment the continuity of an electric current, sets in action an electro-magnetic apparatus, and makes a permanent mark or record.

CHRONO'LOGY is the science of the divisions of time. It has two main branches—Mathematical C. and Historical Chronology. Mathematical C. is engaged with such of the units for the measurement of time as begin and end with the period of complete evolution of recurring celestial phenomena. See articles CALENDAR, YEAR, MONTH, DAY, and CYCLE, where the chief points in mathematical C. are explained. Historical C. uses these units among others to measure the distance in point of time between events, and to fix their *dates*. As in geography and navigation, longitude is measured from some arbitrary line, such as the meridian through Greenwich, so in historical C., *dates* are fixed by giving their distance from some arbitrary point of time, usually chosen because of some remarkable occurrence which signalised it. Such a fixed point, or *epoch*, forms the beginning of an *Era*. It is thus that *dates* have been aptly said to be to events in history what the latitude and longitude of places are to the places in geography and navigation. The mathematical, or, to speak more properly, the astronomical units of time above referred to have not been, as has been already hinted, the only units used in historical chronology. In early times, the more accurate methods of mathematics were unknown, and such vague periods as a "generation," or the lifetime of leading persons in a nation, such as the priestesses of Juno, or of the kings, were assumed as units in historical chronology. The great variety of eras, too, in ancient times confuses the student of chronology. Thus the era

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of the Greeks began with the year of the first Olympiad, or that in which Corœbus was victor; being the first celebration of the games at which the victor's name was recorded, and which is calculated to correspond to the year 776 B.C. From this epoch, the Greeks measured time by Olympiads or periods of four years. Thus, the third year of the 12th Olympiad would be the year 729 B.C. The Roman era was reckoned from the founding of the city, being either 752 or 753 B.C. The Roman practice of dating events from the building of the city, seems to be the first instance of the method of reckoning time from a fixed point by single years. It thus forms one of the great stages in chronology. Of other eras we shall merely mention the Mohammedan, which commences with the flight of Mohammed, 622 A. D., and wich is called the *Hedjrah* (q. v.). The Roman and Greek methods of measuring time continued to be in use long after the birth of Christ; the Olympiads, indeed, appear to have been employed in Europe down to the 304th Olympiad, or 440 A.D. From 312 A.D., however, the public mode of computation throughout the Roman empire was by indications, which were periods of 15 years, beginning with that year (see INDICATION); and this mode was at one time almost universally followed in the west. In France, it was not altogether discontinued till the end of the 15th century. The Christian era is said to have been first proposed in the year 527 A.D., and is now universally used in Christendom. Part of the business of C. is to determine the relationships of the different eras, so as to enable one to express, in the language appropriate to one mode of computation, the date of an event recorded in another. Owing to the birth of Christ being a comparatively recent event, the Christian era is attended by this inconvenience, that we must count backwards, from it for the date dates of occurrences prior too it. To obviate this, various comprehensive periods, such as the Julian and Louisian Periods have been invented, which have the merit of being applicable to most events lying within the limits of history.

Various systems of C., such as the Chinese, Babylonian, Egyptian, Indian, and Chaldæan, are worthy of attention. Accounts of the periods which these nations respectively assign to their histories, will be found under the heads CHINESE EMPIRE, BABYLON, &c. Of *Sacred* C. there have been various systems. In these the epochs are the Creation of the World, and the Flood; but the chief copies of the Bible do not agree as to the dates of these events. While the Hebrew text reckons 4000 years from the creation to the birth of Christ; and to the flood 1656 years, the Samaritan makes the former much longer though it counts from the creation to the flood only 1307 years. The Septuagint version differs from both. It removes the creation of the world to 6000 years before Christ, and 2250 years before the flood. These differences have never been reconciled. It is now, however, universally admitted that the creation of the world is not to be regarded as having occurred even so recently as 6000 B.C. The modern understanding of the first chapter of Genesis leaves the period of the creation quite indefinite, and one scheme of interpetation stretches out the days of creation into periods of indefinite length. Of the *Newtonian* C., all that can be said here is, that it was an attempt, now generally admitted not to have been very successful, to rectify the obvious blunders of ancient chronologers, by determining certain epochs by means partly of astronomical calculations, and partly of the critical examination of such chronicles as measured time by reigns and generations. By a very fine argument, the soundness of which has since been doubted, Newton set down the date of the Argonautic expedition as being 43 years after the death of Solomon, or 937 B.C.

CHRONO'METER, or time-measurer, is the name given principally to such time-keepers as are used for determining the longitude at sea. The mechanism is essentially the same as that of a common watch; only the size is generally greater, and additional precautions are taken to secure regularity under changes of temperature and other deranging influences. See HOROLOGY.

CHRO'NOSCOPE, an instrument contrived by Sir Charles Wheatstone to measure the duration of certain short-lived luminous phenomena, such as the electric spark, of which the eye itself can be no judge, owing to the persistence of impressions of light on the eye after the cause of sensation has ceased. The phenomenon is observed by reflection in a mirror, in such rapid motion that the image of the luminous object would appear to describe a circle, supposing the luminosity to endure long enough. Should the phenomenon be instantaneous, the image will appear as a mere point; should it last for an appreciable time, the image will form an

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arc, greater or less, of the circle. The electric spark is found by this test to have no duration.

CHRU'DIM, a town of Bohemia, beautifully situated on a small river, about 65 miles south-east of Prague. It is walled, has a noble collegiate church, a high school and Capuchin convent, manufactures of cloth, and very important horse-markets. Pop. (1869) 11,218.

CHRY'SALIS, or Chry'salid, a name originally Greek, and strictly belonging to those *pupæ* of butterflies which are adorned with golden spots, but extended to the pupæ of lepidopterous insects generally, and even of other orders of insects. The chrysalids of lepidopterous insects are enclosed in a somewhat horny membranous case; sometimes very angular, sometimes nearly round; generally pointed at the abdominal end, sometimes at both ends; and before the caterpillar undergoes its transformation into this state, it often spins for itself a silken cocoon, with which earth and other foreign substances are sometimes mixed, so as to increase its size, and within which the chrysalid is concealed. Chrysalids are often suspended by cords, and generally remain nearly at rest; some have the power of burying themselves in the earth; others are bound by a single silken thread which passes round their middle; some twirl themselves round when touched, or when the stalk or leaf to which they are suspended is touched; and in general, they give signs of life, when disturbed, by violent contortions of the abdominal part. See INSECTS; PUPA; LEPIDOPTERA; BUTTERFLY, HAWK-MOTH, MOTH, and SILKWORM.

CHRYSA'NTHEMUM (Gr. gold-flower), a genus of plants of the natural order *Compositæ*, sub-order *Corymbiferæ*; having a hemispherical or nearly flat involucre, with imbricated scales, which are membranous at the margin, a naked receptacle, the florets of the disk tubular and hermaphrodite, those of the ray strap-shaped and female, the fruit destitute of pappus. The species of this genus are annuals, perennials, or shrubby; and all have leafy stems. They are natives chiefly of the temperate parts of the old world. *C. leucanthemum*, the OX-EYE, or OX-EYE DAISY, is abundant in fields, meadows, and grassy places of woods, in most parts of Europe. It has large flowers, with white ray and yellow disk. It is often a troublesome weed among hay and in pastures; being perennial, and having a creeping brittle root-stock, it is not easily extirpated. It is common in Britain, which has only one other native species, *C. segetum*, CORN MARIGOLD, a frequent weed in cornfields—although rare in the neighborhood of Edinburgh—an annual, with large deep yellow flowers. It is dealt with like annual weeds in general, by pulling it when young.—*C. carinatum*, an annual species with white ray and dark-red disk, the scales of the involucre keeled, a native of Barbary, is frequently cultivated in green-houses or—where the climate permits—in flower-gardens. The favorite species of the gardener is, however, *C. Indicum*, the CHINESE or INDIAN C., a native of China, Cochin-China, and Japan; which has long been cultivated in its native countries as an ornamental plant, and of which there are many varieties. Its colors are also very various—red, lilac, rose-color, white, yellow, orange, or two colors combined. It flowers in autumn and winter. It is easy of cultivation, succeeds best in a light rich soil, is easily propagated by cuttings, suckers, or parting the roots, but requires the green-house in Britain. It was introduced in 1789. It is reckoned among florists' flowers.

CHRYSELEPHA'NTINE, (Gr.; from *chryson*, gold, and *elephas*, ivory), the art of making images of gold and ivory, was extensively practised amongst the Greeks. Winckelmann has calculated that about 100 statues of this kind are mentioned by the ancients. The colossal works executed by Phidias at Athens, in the time of Pericles, are the most famous of this class, the greatest being the Pallas of the Parthenon. It was 26 cubits high and represented the goddess in armor, covered with a long robe. The famous Olympian Jupiter of Phidias, executed in the same materials, was also a world-wide wonder. The combination of gold and ivory was chiefly used in temple statues; and though the execution of the more famous works of this class belongs to an advanced period of art, the use of various materials in the same statue was very ancient, and probably borrowed from the custom of adorning the wooden images of the earliest time with the precious metals. sometimes, too, the head, the arms and hands, and the feet were of marble, whilst the rest was of wood, covered with thin plates of gold. These were called Acrolites (*akrolithoi*). See STATUARY.

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CHRYSI'PPUS, an eminent Stoic philosopher, was born about 280 B.C., at Soli in Cilicia. He came to Athens when still a youth, and eagerly addicted himself to philosophical pursuits. His principal master was Cleanthes, although he is said to have also studied under the academic teachers, Arcesilaus and Lacydes, and learned from them what were the objections urged by sceptics against the doctrines of the Stoics. He had the reputation of being the keenest disputant of his age, and was happily described as "the knife for the academic knots." In fact, his logic was held to be so convincing, that people were wont to say: "If the gods make use of dialectic, it can only be that of Chrysippus." It is also related of him, that he told Cleanthes he merely wanted to know the principles of his system, as he intended to find arguments for them himself; and this story appears to indicate his true position in philosophy. He was not the creator of a new system, but the expounder of an old. C.'s industry was very great. He seldom wrote less than 500 lines a day, and is said to have composed more than 700 works. Many of these, however, were compilations, and were not characterised by great beauty of style. Only a variety of fragments remain, which have been edited by Petersen ("Philosophiæ Chrysippeæ Fundamenta," (Altona and Hamburg, 1827).

CHRY'SIS, a Linnæan genus of hymenopterous insects, now constituting a family *Chrysidæ*, allied to the *Ichneumonidæ*, and forming a connecting-link between them and bees, wasps, &c. The French call them *Guêpes dorées* (gilded wasps), and they sometimes receive the English names of *Golden-tailed* and *Ruby-tailed Flies*. They delight in sunshine, and may be seen poised in the air—the motion of their wings being so rapid as to render the body alone of the insect visible.

CHRYSOBALANA'CEÆ, or Chrysobalaneæ according to some botanists, a distinct natural order of plants; according to others, a sub-order of ROSACEÆ (q. v.). They are distinguished from the other plants usually included in the order Rosaceæ by their irregular petals, and by having the stamens also irregular, either in size or position; the ovary stalked, its stalk adhering on one side to the calyx, the style proceeding from its base. The fruit is a drupe of one or two cells. The species are trees or shrubs, natives generally of tropical and sub-tropical regions. About 50 species are known. The fruit of many is eatable, as the COCOA PLUMS (q. v.) of the West Indies (*Chrysobalanus*), the fruit of *Parinarium excelsum* in Sierra Leone, and that of *Moquilea grandiflora* in Brazil. The kernels of some resemble sweet-almonds, as those of *Parinarium campestre* and *P. montanum*. A useful oil is expressed from the seeds of *Prinsepia utilis*, a spiny plant, common in some parts of the Himalaya Mountains, and which is also planted for hedges in the Khasia Hills, at an elevation of 5725 feet above the sea; whilst in Sikkim it is only found where the elevation is above 8000 feet. This plant would in all probability succeed well in Britain, and an attempt should certainly be made to introduce it.

CHRY'SOBERYL, a gem almost as hard as sapphire, and the finer specimens of which are very beautiful, particularly those which exhibit an opalescent play of light. Lapidaries sometimes call it oriental or opalescent chrysolite. It is of a green color, inclining to yellow, semi-transparent, or almost transparent, and has double refraction. It occurs crystallised in six-sided prisms; often in macles, or twin crystals. It is found in granite, in sandstone, and in alluvial soil; in Ceylon, Pegu, Siberia, Brazil, and in Connecticut. It is composed of alumina, glucina, and a little protoxide of iron; the alumina being about 80 per cent. of the whole.

CHRYSOCO'LLA, or Copper-green (Gr. gold-glue), an ore of copper, found in Cornwall and in many parts of the world, but particularly in Wisconsin and Missouri, where it is so abundant as to be worked for copper. As a pigment, it was much used by the ancients.

CHRY'SOLITE (Gr. golden-stone), a mineral composed of silica, magnesia, and protoxide of iron; of a fine green color, with vitreous lustre; transparent, and having double refraction; in hardness, about equal to quartz; and with conchoidal fracture. It often crystallises in four-sided or six-sided prisms, variously modified. Very fine specimens are brought from Egypt and from some parts of the east, also from Brazil. C. is used by jewellers as an ornamental stone, but is not highly valued. *Olivine*, which occurs generally massive, in grains and roundish pieces, and is frequent in volcanic countries, and found in the igneous rocks of some parts of

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Scotland—as on Arthur's Seat—is regarded as a coarse variety of chrysolite.—The Chrysoberyl (q. v.) is sometimes called C. by jewellers.

CHRYSOLO'RAS, Manuel, a learned Greek of Constantinople, was born in the middle of the 14th century. He is regarded as the first who transplanted Greek literature into Italy. About the year 1391, the Byzantine emperor, John Palæologus, sent C. to England and Italy to entreat assistance against the Turks. This mission made C. known in Italy, and, in 1397, he left his native land and went to Florence, where, as teacher of Greek literature, he was highly esteemed and admired. Leonardo Bruno, Poggius, Philelphus, Guarinus of Verona, and other eminent scholars were pupils of his. He was afterwards employed in public services—especially in mediating a union of the Greek with the Roman Church—by Pope Gregory XII. In 1413, C. went with John XXII. to the council of Constance, where he died 1415. Besides theological works, his *Erotemata*, or "Accidence or the Greek Language" (Venice, 1484), has been preserved—Manuel C. must be distinguished from his nephew, JOHN CHRYSOLORAS, who also went to Italy and gave lessons in Greek.

CHRYSOMELA and Chrysomelinæ. See GOLDEN BEETLE.

CHRYSOPHYLLUM. See SAPOTACEÆ, MONESIA BARK, and STAR APPLE.

CHRY'SOPRASE is merely a variety of chalcedony, but is valued far above common chalcedony as an ornamental stone; so that a stone of this kind, fit for mounting in a ring, is worth from £10 to £20. It is of a fine apple-green color in choice specimens, but inferior ones exhibit other shades of green, and it is sometimes spotted with yellowish-brown. It is often set in a circlet of diamonds or pearls. Unfortunately, it is apt to lose its color through time, particularly if kept in a warm place; but dampness is favorable to its preservation, and it is therefore sometimes kept in damp cotton. It is found in Lower Silesia—where the search for it was particularly encouraged by Frederick the Great—and in Vermont. The inferior specimens are made into brooches, necklaces, &c.; and those still coarser, into snuff-boxes, seals, cups, &c.—The C. of the ancients was a stone of yellowish-green color, but it is not certain what is was.

CHRY'SOPS. See CLEG.

CHRY'SOSTOM, John (Gr. *Chrysostomos*, golden-mouth; so named from the splendor of his eloquence), was born at Antioch in 347 A.D. His mother Anthusa was a pious woman, wholly devoted to her son, who grew up under her loving instructions into an earnest, gentle, and serious youth, passing through, as Neander significantly observes, none of those wild, dark struggles with sinful passions which left an ineffaceable impress on the soul of Augustine, and gave a sombre coloring to his whole theology. He studied oratory under Libanius, a heathen rhetorician; soon excelled his teacher; and, after devoting some time to the study of philosophy, retired to a solitary place in Syria, and there read the Holy Scriptures. The ascetic severity of his life and studies brought on an illness which forced him to return to Antioch, where he was ordained deacon by Bishop Meletius in 381, and presbyter by Bishop Flavianus in 386. The eloquence, earnestness, and practical tone of his preaching excited the attention of Jews, heathens, and heretics, and secured for him the reputation of the chief orator of Eastern Church. In 397, the eunuch Eutropius, minister of the Emperor Arcadius, who had been struck by the bold and brilliant preaching of C., elevated him to the episcopate of Constantinople. C. immediately began to restrict the episcopal expenditure in which his predecessors had indulged, and bestowed so large a portion of his revenues on hospitals and other charities, that he gained the surname of "John the Almoner." He also endeavored to reform the lives of the clergy, and sent missionaries into Scythia, Persia, Palestine, and other lands. His faithful discharge of his duties, especially in reproof of vices, excited the enmity of the patriarch Theophilus and of the Empress Eudoxia, who succeeded in deposing and banishing him from the Capital. He was soon recalled, to be banished again shortly afterwards. He now went to Nicæa, in Bithynia; but was from thence removed to the little town of Cucusus, in the desert parts of the Taurus Mountains. Even here his zeal was not abated. He labored for the conversion of the Persians and Goths in the neighborhood, and wrote the seventeen letters (or rather moral essays) to Olympias, to whom he also addressed a treatise on the proposition—"None can hurt

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the man who will not hurt himself." The emperor, enraged by the general sympathy expressed towards C. by all true Christians, gave orders that he should be more remotely banished to a desolate tract on the Euxine, at the very verge of the Eastern Roman empire. Accordingly, the old man was made to travel on foot, and with his bare head exposed to a burning sun. This cruelty proved fatal. C. died on the way at Comanum, in Pontus, September 14, 407 A.D., blessing God with his dying lips. The news of his death excited much sorrow among all pious Christians, for C. was a man who drew the hearts of his fellows after him; a lovable, manly Christian, hating lies, worldliness, hypocrisy, and all manner of untruthfulness; with that honest warmth of temper which all vigorous people relish. A sect sprang up after his death, or martyrdom as they conceived it, called *Johannists*, who refused to acknowledge his successors; nor did they return to the general communion till 438, when the Archbishop Proclus prevailed on the Emperor Theodosius II. to bring back the body of the saint to Constantinople, where it was solemnly interred, the emperor himself publicly imploring the pardon of Heaven for the crime of his parents, Arcadius and Eudoxia. The Greek Church celebrates the festival of C. on the 13th of November: the Roman, on the 27th of January. In his "Homilies" (Thomas Aquinas said he would not give in exchange those on St Matthew for the whole city of Paris) C. displays superior powers of exegesis. In general, he rejects the allegorical system of interpretation, and adheres to the grammatical, basing his doctrines and sentiments on a rational apprehension of the letter of Scripture. He is, however, far from being a bibliolater. He recognised the presence of a human element in the Bible as well as a divine; and instead of attempting, by forced and artificial hypotheses, to reconcile what he thought irreconcilable in Scripture statements, he frankly admitted the existence of contradictions, and shaped his theory of inspiration accordingly. But his greatest and noblest excellence lay in that power, springing from the fervor and holiness of his heart, by which the consciences of the proud, the worldly, and the profligate were awakened, and all were made to feel the reality of the gospel message. The surname C. was first supplied some time after his death, and, as it is supposed, by the sixth œcumenical council in 680. C.'s works are very numerous, and consist of, 1st, "Homilies," on parts of Scripture and points of doctrine; 2d. "Commentaries," on the whole Bible (part of which has perished); 3d, "Epistles," addressed to various people; 4th, "Treatises," on different subjects (such as Providence, the Priesthood, &c.); and 5th, "Liturgies." Of these the most valuable, as well as the most studied, are the "Homilies," which are held to be superior to everything of the kind in ancient Christian literature.

The most correct Greek edition of C.'s works is that by Henry Savil (8 vols., Eton, 1613); and the most complete Greek and Latin edition is that by Montfaucon (13 vols., Par. 1718—1738; republished in 1834—1840). The best authority in regard to C. is Neander, who, besides treating of his life and labors in his "Kirchengeschichte," published a life of this eminent Father.

CHRY'SOTYPE (Gr. *chrysos*, gold; *typos*, impression), a photographic process invented by Sir John Herschel, and depending for its success on the reduction of a persalt of iron to the state of protosalt by the action of light, and the subsequent precipitation of metallic gold upon this protosalt of iron. The process is conducted as follows: Good paper is immersed in a solution of ammonio-citrate of iron of such a strength as to dry into a good yellow color, without any tinge of brown in it. It is then exposed to light under a negative until a faint impression is obtained. A neutral solution of chloride of gold is then brushed over the paper, when the picture immediately appears, and is rapidly developed to a purple tint. It should then be freely washed in several changes of water, fixed with a weak solution of iodide of potassium, again thoroughly washed, and dried. The action of the iodide of potassium is to convert any unaltered chloride of gold into a soluble double iodide of gold and potassium, thus rendering the picture permanent.

CHUB (*Leuciscus Cephalus*), a fish of the family *Cyprinidæ*, of the same genus with the roach, dace, bleak, minnow, &c. See LEUCISCUS. The color is bluish-black on the upper parts, passing into silvery white on the belly; the cheeks and gill-covers rich golden yellow. The C. rarely attains a weight exceeding 5 lbs. It is plentiful in many of the rivers of England, and occurs in some of those of the south-west of Scotland. In the rivers of Cumberland it bears the name of *Skelly*, supposed to have reference to the size of its scales; but the Schelly of Ullswater

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Lake is the Gwyniad, and the C. is there called the *Chevin*. It is found in many rivers of the continent of Europe; being the *Jentling* or *Bratfisch* of the Danube, and the *Jese* of the Oder. It spawns in April and May. It is not in great esteem for the table.

The C. rises well at a fly, and takes freely a variety of baits. The same baits and the same means of fishing may be employed as for the barbel and bream. The C. is very fond, moreover, of slugs, grasshoppers, cockchafers, and humble-bees. The latter two are to be used either naturally, by means of dibbing or dapping, or, being imitated, may be used artificially, and cast as a fly. The best flies for the C. are large red, black, and brown palmers, with the hackles laid on thickly. The best places to fly-fish for C. are close under overhanging boughs at the sides of streams, or against piles, or other places where they can get some shelter, for the C. is somewhat shy and easily alarmed. He is a bold riser, and when he comes at a fly seldom fails to hook himself. Of all the baits for bottom-fishing, he prefers greaves, cheese, and worms; and the fatter the bait the better he likes it. He will occasionally run at a minnow, and is often taken on a spinning bait. The C. spawns in May, and comes into condition again by the end of June or early in July; bites best, and is in the best condition for bottom-fishing, in October and November. When first hooked, he makes a great dash, but he very soon gives in. Some years ago, the scales of the C. were in much request, in common with those of the bleak, for artificial pearl-makers.

CHUBB, Thomas, an English rationalist, who wrote on religious questions during the first half of the last century, was born at East Harnham, in Wiltshire, in 1679. He received but a meagre education in youth, and after an apprenticeship to a leather glove and breeches maker in Salisbury, he became a tallow-chandler, in which business he continued to the end of his life. His first work, published in 1715, was entitled "Supremacy of God the Father Vindicated." Besides this, he wrote a multitude of treatises on other religious subjects. Among these may be mentioned: "A Discourse on Reason, as a sufficient Guide in matters of Religion;" "On Sincerity;" "On Future Judgment and Eternal Punishment;" "Inquiry about Inspiration of the New Testament;" and "Doctrine of Vicarious Suffering and Intercession Refuted." C. died in 1746.

CHUCK-WILL'S-WIDOW (*Antrostomus Carolinensis*), a bird of the Goatsuckes amily (*Caprimulgidæ*), a native of the southern parts of the United States. It hars freceived its singular name from its note, which resembles these words or syllable articulated with great distinctness, and is repeated like that of the cuckoo, or of its own congener, the Whip poor-will (q. v.).

CHUCUI'TO, or Chuquito, a town of Bolivia, in the dep. of Puno, and 100 miles east-north-east of Arequipa, on the west shore of Lake Titicaca, at the mouth of a stream flowing from the Andes. It was formerly of much greater size and importance than it is at present, having had, it is said, at the beginning of the 18th c., the incredible number of 300,000 inhabitants. Its present pop. is only about 5000. In the province of the same name, of which it is the capital, there are mines of silver and gold, and interesting antiquarian remains.

CHU-LAN. See CHLORANTHACEÆ.

CHUMBU'L, a river rising in the Vindhyan Mountains, which form the southern limit of the basin of the Ganges. Its source, at a height of 2019 feet above the sea, is in lat. 22° 26′ n., and long. 75° 45′ e. During a generally north-east course of 570 miles, it receives many tributaries on both sides, till, in lat. 26° 30′ n., and long. 79° 19′ e., it enters the Jumna from the right, with such a volume of water, that, when itself flooded, it has been known to raise united the stream 7 or 8 feet in twelve hours. The C. is remarkable, here and there, for the wildness of its current and the picturesque character of its banks.

CHU'NAM, the Indian name for a very fine kind of quick-lime made from calcined shells or from very pure limestone, and used for chewing with Betel (q. v.), and for plaster. Both recent and fossil shells are used for making chunam. Extensive beds of fossil shells employed for this purpose occur in the south of India particularly in low marshy situations near the sea-coast. The shells used are in the

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first piece very carefully cleaned; they are then calcined in kilns, with wood charcoal. When chunam is to be used for plaster, it is mixed with the fine river-sand, and thoroughly beaten up with water. A little *jaggery* (coarse sugar) is also added. When very beautiful work is desired, three coats of chunam are given to the wall, and the result is a plaster almost equal to marble in its polish and beauty. The third coat is applied in the form of a very fine paste, consisting of four parts of lime and one of fine white sand, beaten up with whites of eggs, sour milk, and *ghee* (butter). After it has been rubbed on with a wooden rubber, the surface is washed with a cream of pure lime, and is rubbed with a polished piece of quartz or rock crystal. During this process, the wall is sprinkled with powder of pot-stone, and the rubbing is continued until the wall is quite dry, every trace of moisture being finally removed by a cloth. Chunam is an important article of trade in India.

CHUNARGU'RH, or Chunar, a fortified town on the right bank of the Ganges, 16 miles to the south-west of Benares, and in the division of that name. It is in the district of Mirzapore, and lieut.-governorship of the North-west Provinces. The population of the town in 1871 amounted to 10,154. The fortress, which occupies the summit of a sandstone rock, contains the commandant's house, the hospital, the prison, and an ancient palace, with a deeply excavated well of indifferent water. The river in front is navigable at all seasons for vessels of from 50 to 60 tons.

CHUQUISA'CA, or Su'cré, the capital of Bolivia or Upper Peru, in lat. 19° 20' s., and long. 65° 30' w. It is situated on a table-land about 9000 feet above the sea, and has a pleasant climate. The town is well built, has a cathedral of great magnificence, a university, a college of arts and sciences, and a mining-school. C. was founded in 1538 by Pedro Anzures, an officer of Pizarro's, on the site of an old Peruvian town called "Choque Chaka," or "Bridge of Gold," "the treasures of the Incas having passed through it on their way to Cuzco." At one time, C. bore the name of La-Plata, on account of the rich silver mines in its vicinity. Population, 23,979. C. gives name to a territory containing 223,668 whites, besides many native Indians. It has five silver mines in operation; and in it are magnificent ruins of unknown origin. The second name is derived from the general who, in December 1824, fought and won the last great battle for colonial independence at Ayacucho.

CHUR (Fr. *Coire*, anct. *Curia Rhætorum*), a town of Switzerland, capital of the Grisons, in the valley of the Upper Rhine, in a fertile plain about 2000 feet above the sea, and surrounded by high mountains, 60 miles south-east of Zurich, on the Plessur, about a mile from its junction with the Rhine. It is of importance as standing on the great road to Italy by the Splügen and Bernardin passes and thus possessing a considerable transit trade. C. stands on uneven ground, has narrow streets, and is divided into a high and low town. The bishop's palace, and the quarter around it, inhabited by the Roman Catholics, occupy the summit of an eminence, and are separated from the rest by walls and battlements, closed by double gates. In the same quarter stand the old cathedral, a round, arched, or Byzantine edifice, founded in the 8th c.; the Church of St. Lucius or the *Dom*, a curious example of early-pointed Gothic, including fragments of earlier buildings. It contains singular old carving, paintings, and statues, and also, it is said, the bones of St. Lucius, who was a British king. Behind the episcopal palace is a kind of ravine lined with vineyards. In the lower town there are also some very ancient buildings. Romansch is still spoken in the vicinity; a newspaper in this dialect is published in the town; and a considerable collection of Romansch literature is to be found in the library of the cantonal schools. There are several new roads leading in different directions through the Grisons; and a railway connects the town with Zurich and other places. There are manufactures of zinc wares and cutting tools. Pop. (1870) 7552, of whom about 2000 are Catholics.

CHURCH, a word which signifies either a place of Christian worship or a collective body of Christian people. It is in all probability derived from the Greek adjective *kyriakos* (from *kyrios*, lord), the place of worship having been called *the Lord's house*, and the worshippers *the Lord's people*. The Scottish *kirk*, the German *kirche*, &c., are merely different forms of it.

Under the terms APSE and BASILICA (q. v.), we have already explained that the earliest ecclesiastical structures of the Christians were copied or adapted not from

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the heathen or Jewish temple, as might have been anticipated, but from that peculiar combination of a hall of justice and a market place to which the name basilica was given by the ancients. The reason of this selection is probably to be found, not so much in the spirit of opposition which no doubt existed between Christians and heathens, as in the essentially different conceptions which they formed of the character and objects of public worship. The rites of heathendom were performed exclusively by the priest, the people remaining without the temple; and the temple itself, which was lighted only from the door, or by the few lamps which burned around the image of the god, was regarded not as a receptacle for worshippers, but as the abode of the deity. The dark mysterious character which thus belonged to it, rendered it equally unsuitable for the performance of liturgical services in which the people were to participate, and for the delivery of those public addresses which from the beginning were employed as a means of Christian teaching and exhortation. To such purposes the prætor's court room, with its surroundings, were readily adapted, by the few simple alterations which we have described in the articles referred to. But the basilica, as thus altered, was a mere utilitarian structure. It served the purposes of Christian worship, but there was nothing in its form which responded to the feelings of Christian worshippers or tended to awaken Christian sentiments. Now, the Cross (q. v.) had been used by Christians from a very early period to indicate their allegiance to the author of their salvation and the object of their faith; and gradually it had become the distinctive emblem of Christianity. Nothing, then, could be more natural than that when it became desirable to give distinctively Christian characteristics to what hitherto had been a heathen structure, this should be effected by such a modification of its form as should convert it into a representation of this sacred emblem. Nor did this alteration lead to any very extensive change on the form of the C., as it had hitherto existed. The basilica, as we have already explained, not unfrequently had side entrances, either in place of, or in addition to, that from the end. All that was requisite, then, to convert the simple parallelogram of which it consisted into a cross, was, that at each side of the building these entrances, in place of direct communications with the exterior, should be converted into passages, or arms running out at right angles, and more or less prolonged, according as the object was to attain the form of a Greek or of a Latin cross (see Cross). If the C. was to be in the form of a Greek cross, the arms were made of the same length with the other two portions into which they divided the building; whereas if the cross was to be a Latin one, the portion of the building which ran towards the west was made considerably longer than either of the others. In either case, the arms running at right angles to the C., and directly opposite to each other, cut it across, and thus obtained the name of *transepts*.

The external form of the C. being thus indicated, we now proceed to explain its internal arrangements, and to enumerate the various adjuncts which in cathedrals and others of the larger churches frequently sprung up around it.

Over the point at which the arms or transepts intersect the body of the cross, a central tower or spire is very frequently erected. From this central tower, or, if the tower or towers are situated elsewhere, from this central point, the portion of the building which runs westward, to where the Galilee or entrance chapel, or, in other instances, the great entrance-door is situated, is called the Nave (from *navis*, a ship), whilst the portion which runs eastward to where the altar, or high-altar, if there be several, is placed, is called the Choir. In the larger and more complete churches, the nave, and frequently also the choir, are divided longitudinally by two rows of pillars into three portions, the portion at each side being generally somewhat narrower and less lofty than that in the centre. These side portions are called the aisles of the nave, or of the choir, as the case may be. In some churches, the aisles are continued along the transepts, thus running round the whole C.; in others there are double aisles to the nave, or to both nave and choir, or even to nave, choir, and transept. Behind, or to the east of the choir, is situated the Lady's Chapel, or Chapel of the Virgin, with sometimes a number of altars; and it is not unusual for side chapels to be placed at different places along the aisles. These usually contain the tombs of the founder, and of other benefactors to, or dignitaries connected with, the church. The extent to which these adjuncts exist depends on the size and importance of the C., and they

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are scarcely ever alike in two churches, either in number, form, or position. Vestries for the use of the priests and choristers generally exist in connection with the choir. Along the sides of the choir are ranged richly ornamented seats or stalls, usually of carved oak, surmounted with tracery, arches, and pinnacles; and amongst these seats, in the case of a bishop's church, the highest and most conspicuous is the so-called *cathedra*, or seat for the bishop, from which the cathedral takes its name. The larger English cathedral and abbey-churches have usually a chapter-house attached to them, which is of various forms, most commonly octagonal, and is often one of the richest and most beautiful portions of the whole edifice. On the continent, chapter-houses are not so common, the Chapter (q. v.) being usually held in the cathedral itself, or in one of the chapels attached to it. Cloisters (q. v.) are also frequent, and not unusually the sides of those which are furthest removed from the C. or chapter house, are enclosed by other buildings connected with the establishment, such as a library, and places of residence for some of the officials of the cathedral. It is here that, in Roman Catholic churches, the hall, dormitories, and kitchens for the monks are commonly placed. Beneath the C. there is frequently a Crypt (q. v.). In some cathedral churches, the crypt is in reality a second underground C. of great size and beauty. The Baptistery (q. v.) is another adjunct to the C., though frequently forming a building altogether detached.

Churches are of five classes—metropolitan, cathedral, collegiate, conventual, and parish churches—and of these the first are, generally speaking, the most, and the last the least elaborate. In ordinary language, any building set apart for religious ordinances is called a church, though, when of a minor kind, it is more usually designated a chapel. After a long period of neglect and poverty of taste, the building of churches in a superior style, emulative of the older styles of architecture, has greatly revived not only as regards the Church of England, but the Church of Scotland and nearly all dissenting bodies.

As applied to a collective body of Christian people, the word C. is the translation and equivalent of the Greek word *ecclesia* (Lat. *ecclesia*, Fr. *église*), used in the New Testament. It is common among Protestants to distinguish between the *visible* and the *invisible* C.—the invisible C. consisting of all those who are savingly or spiritually united to Christ, that is, of all true believers; the visible C. consisting of all who profess the religion of Jesus Christ. Roman Catholics do not in the same manner acknowledge the distinction between the visible and the invisible C., but regard a connection with the hierarchy and consequent participation of ordinances, as establishing a connection with the true C. and with Christ. Protestants regard the C. as subsisting from age to age, in virtue of the authority of Christ, and through the faith of individual believers and their confession of him; Roman Catholics regard the apostolical succession of the hierarchy, and the regular administration of the sacraments as essential to the continued existence of that *Catholic* or universal C. which Christ planted on the earth, and the existence of which he has promised to maintain throughout all ages. Protestants in general, regard the C. of Rome and the Greek C. as forming part of the visible C. of Christ; but Roman Catholics are not accustomed to make a corresponding admission with respect to the Protestant churches. From the hierarchical principle of the C. of Rome and of the Greek C., results an employment of the term C. to designate the hierarchy alone, which is contrary to the principles of the Reformation, although a tendency to it may be observed in some Protestant churches. It has been usual for Protestants to designate by the term C. the collective body of Christians in a particular country, distinguished by the name of that country; the greater number of Protestants (Episcopalians and Presbyterians) believing that such a portion of the universal C. may warrantably be associated under a common government; and in countries where religious liberty exists, diversities of opinion on points of doctrine and C. government have given rise to the existence of separate Christian associations, distinguished by names generally indicative of some of the peculiarities which characterise them; but these, however much they may differ on many points, do not in general hesitate to recognise each other as belonging to the universal visible C. of Christ, whilst they retain in common the same great first principles of the Christian faith, and particularly the belief in one God and in the three persons of the Godhead, the incarnation of the son of God, the atonement by Jesus Christ, and the work of the Holy Spirit. The term C., however, is regarded by Independ-

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ents (q. v.) or Congregationalists, as more strictly applicable to those who are united as worshippers in a particular place of worship partaking of the Lord's Supper together, and exercising discipline and C. government among themselves.

CHURCH, States of the. See PAPAL STATES.

CHURCH-DISCIPLINE (*Disciplina ecclesiastica*) includes all the means employed by the Christian Church, besides the ministration of word and sacraments to secure on the part of its office-bearers and members a faithful adherence to their profession and a corresponding blamelessness of life. It rests upon the authority of Christ, and at the same time necessarily arises, in some form of it, out of the very constitution of the church as a society. Among the early Christians, it soon assumed forms of great severity towards offenders, especially towards the *Lapsed* (q. v.). At a later period, the discipline of the church was chiefly exercised with respect to persons accused of heresy and schism. The penances of the Church of Rome have long formed an important part of its discipline, and therewith its *indulgences* (q. v.) are closely connected, as well as its doctrine and rule of *Auricular Confession* (see CONFESSION). In the Protestant churches, public confession of sins by which public scandal has been given, and submission to public rebuke, are sometimes required. Practices more analogous to those of the primitive church were established in many churches after the Reformation, but in general have fallen greatly into disuse. The power of exclusion from the Lord's Supper, and from the rights and privileges of church membership, is, however, generally retained and exercised, until, by profession of repentance, and by reformation of life, the cause of such exclusion is removed; and ministers or other office-bearers are, upon offence given in their doctrine or conduct, suspended from their functions, or altogether deposed from their office. The exercise of C. D. belongs more or less exclusively to a hierarchy, or to the office-bearers assembled in church-courts, or to the members of each congregation, according as the church is Episcopalian, Presbyterian, or Independent in its church-government. There is an increasing tendency among Christians in general, to scrutinise closely the claim of right to exercise C. D., and the limits within which it may be exercised.

CHURCH GOVERNMENT. The Christian Church, like every other society, must have a certain constitution and rules according to which its affairs are administered. It is disputed, however, among Christians, how far this constitution has been defined, or these rules prescribed by divine authority, and how far they have been left to the discretion of men. The form of C. G. depends primarily on the idea entertained of the constitution of the church. Congregationalists, or Independents (q. v.), accordingly place all C. G. in the hands of the members of the congregation and the office-bearers whom they have elected. This theory of C. G. is maintained by many Baptists and others, who, for various reasons, assume different denominations.—Episcopalians and Presbyterians agree that many congregations are to be united under a common government; but this, according to Presbyterians, is properly carried on by ministers and elders of these congregations meeting for this purpose on a footing of equality; whilst, according to Episcopalians, it is more or less absolutely in the hands of bishops, who are superior to the mere pastors of congregations. See EPISCOPACY and PRESBYTERIANISM.

CHURCH HISTORY, or Ecclesiastical History. The history of the Christian religion and church forms one of the most important parts of the general history of mankind, and is intimately connected not only with the political history of the world, but with the history of philosophy, of literature, and of civilisation. The sources and authorities are extremely various, and their due appreciation often requires as much judgment as their exploration requires toil. C. H. is either general—embracing a view of the affairs of the church in the whole world from the beginning to the present day—or particular, relating to some particular country, or time, or portion of the church. By some authors, it has been treated chiefly with regard to the outward affairs of the church; and by others, with reference to doctrine, morals, and the evidences of spiritual life; whilst others still have devoted their attention chiefly to the forms of worship, the constitution of the church, and other things generally comprehended under the name of Ecclesiastical Antiquities. All these, of course, have important relations to each other. The earliest writers of C. H. were in general mere chroniclers, following the order of time; in the great work

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of the Magdeburg Centuriators, a method was adopted, of which there had been previous examples, and which afterwards became frequent, of treating each century separately, the centuries being subdivided according to convenience of subjects; but arrangements less mechanical and arbitrary have been adopted by the most eminent modern authors. With much diversity on minor points, there is a general agreement in dividing the whole history of the church into three great periods; the first, from our Saviour to the time of Constantine; the second, from that time to the Reformation; and the third, from the Reformation to the present day.

The earliest facts of C. H. are to be learned only from the New Testament after which, however, the epistles and other writings of the apostolic and other primitive fathers, afford sources of information, unfortunately very scanty; Hegesippus, who wrote about the middle of the 2d c., has transmitted to us some very imperfect memorials of these early times; but the first proper ecclesiastical history is that of Eusebius of Cæsarea (324). This work was continued to the 7th c. by Socrates Scholasticus, Hermias Sozomenus, and Theodoret. Similiar compilations were executed by Lactantius, Epiphanius, Hieronymus, Theodoret of Cyrus, Philostorgius, and Zosimus. In the 6th c., the chief ecclesiastical historians are—Theodorus Lector, Evagrius, and Nicephorus Callistus; in the 8th, the venerable Bede and Paul Warnefried; in the 9th, Theophanes Confessor, Claudius of Turin, Haymo of Halberstadt, Scotus Erigena, and Hinkmar of Rheims; in the 12th and 13th, Photius, Simeon Metaphrastes, Theophylact, Matthew Paris, Albert of Strasburg, and Ptolemy of Lucca; in the 15th, Laurentius Valla is the most conspicuous name. Protestant writers were the first to treat C. H. in a critical and scientific manner. This was natural, for their position as apparent schismatics compelled them to vindicate historically the changes which they had wrought in the character of the church. Hence their writings were of an apologetic and polemical cast. The first work of this kind was the "Magdeburg Centuries" (q. v.), published by Matthias Flacius. Special histories of the Reformation were composed by Sleidan and Seckendorf. In the 17th c., Calixtus distinguished himself in this department, and after him Thom. Illig, Adam Rechenberg, and Thomasius. The new life that awoke in Germany towards the middle of the 18th c., produced a multitude of church-historians, of whom we can only afford to mention Arnold, C. M. Pfaff, Mosheim, Semler, and J. Matth. Schröckh; while in still more recent times, Marheineke, Danz, Neander, Gieseler, and Hagenbach, have achieved the highest distinction in the same sphere of labor. But others besides the Lutheran divines have rendered valuable services to church history. The Reformed Church boasts the eminent names of Du Moulin, Joh. Dallæus, Blondel, Hottinger, Spanheim, Turretin, Venema, Jablonski, and recently, D'Aubigné; while among Englishmen, Usher, Pearson, Bingham, Lardner, and recently, Milman and Maurice, have won a distinguished place. Scotland has few names, the chief being Calderwood, Wodrow, M'Crie, and recently Cunningham. In the Roman Catholic Church, since the period of the Reformation, ecclesiastical historians have rarely manifested a dispassionate and philosophic spirit. They have appeared mainly in the character of defenders of the papacy. The greatest names in C. H. in Catholic France are Tillemont, Bossuet, Bayle, Du Pin, Thomassin, and Fleury. Among the Italians may be mentioned Orsi, Saccharelli, Pallavicini, Guicciardini, and Muratori; and among the Roman Catholics of Germany, Dannenmayr, Count Stolberg, Ritter, Hortig, Döllinger, &c.

For the benefit of the English reader, it may be stated that the extensive, profound, and philosophic work of Dr Augustus Neander has been translated from the original German into English, and is published in 10 vols. by Bohn.

CHURCH RATES, in England, a tax or assessment laid on the parishioners and occupiers of land within a parish, by a majority of their own body in vestry assembled, for the purpose of upholding and repairing the fabric of the church and the belfry, the bells, seats, and ornaments, the churchyard fence, and the expenses (other than those of maintaining the minister) incident to the celebration of divine service. The parishioners are convened for this purpose by the Church-wardens (q. v.). The Chancel (q. v.) being regarded as belonging peculiarly to the clergy, the expense of maintaining it is laid on the rector or vicar, though custom frequently lays this burden also on the parishiners, as in London and elsewhere.

The C. R. were anciently a charge on the tithes of the parish, which were

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divided into three portions; one for the structure of the church, one for the poor, and the third for the ministers of the church. This distribution is said to have originated with Pope Gregory, who enjoined St Augustine thus to divide such voluntary offerings as might be made to his missionary church in England. A canon of Archbishop Ælfric in 970, and an act of the Witenagemote in 1014, in Ethelred's time have been quoted in proof of the recognition of this rule by our Saxon fathers. It seems to have been their custom, also, to devote to the repair of each church a portion of the fines paid for offences committed within the district attached to it; and every bishop was bound to contribute to the repair of his own church from his own means. A third of the tithes thus originally devoted to the repairs of churches, continued to be applied to that purpose under the Normans, down to the middle of the 13th c.; and the manner in which this burden came to be shifted to the parishioners, has been a subject of much discussion among legal antiquaries. Lord, then Sir John, Campbell, who published a pamphlet on the subject in 1837, is of opinion that the contributions of the parishioners were at first purely voluntary, and that the custom growing, it at last assumed the form of an obligation, and was enforced by ecclesiastical censures. The care of the fabric of the church, and the due administration of its offices, are laid upon the ministers and the church-wardens conjointly, and the latter may be proceeded against by citation, in the ecclesiastical courts, should they neglect these duties. But there is no legal mode of compelling the parishioners as a body to provide the rate; and this circumstance has occasioned much difficulty in imposing the tax in parishes in which dissent is prevalent, and led to many churches falling into a partially ruinous condition. The proper criterion for the amount of C. R. is a valuation of the property within the parish, grounded on the rent that a tenant would be willing to pay for it. Glebe land, the possessions of the crown in the actual occupation of the sovereign, and places of public worship, are not liable for C. R; but there is no other exception as regards immovable property, and in some parishes custom even extends it to stock in trade. It has been often decided in the courts that a retrospective church rate—i. e., a rate for expenses previously incurred—cannot be validly imposed. Much difficulty has been experienced in recovering the rates imposed by the parish on individuals refusing to pay. Previous to 53 Geo. III. c. 127, the only mode was by suit in the ecclesiastical court. That statute, however, in all cases under £10, empowered the justices of the peace of the county where the church was situated, on complaint of the church wardens, to inquire into the merits of the case and order payment. Against the decision of the justices, an appeal lies to the quarter-sessions. In 1868 an end was put to all parochial contentions by enacting that no suit or proceeding should thereafter be allowed in any court to enforce or compel payment of a church rate except where a local act authorised this rate. But except so far as related to the compulsory payment of these rates, the church-wardens might, as before, make, assess, receive, and deal with such rates. In each district parish, the inhabitants may treat their own church as if it were their parish church, and make and receive rates for the repair of the same. A body of trustees may now be appointed in each parish to receive contributions for ecclesiastical purposes in the parish. The result of this act of 31 and 32 V. c. 109, is thus not to abolish church-rates, but rather to convert them into voluntary payments; allowing, as it does, all faithful adherents of the church to contribute, as before, to the repairs of their own churches. In Scotland the burden of upholding the parish churches is by custom imposed on the heritors of the parish; and where the parish is partly within burgh and partly in the country, the expense must be borne by heritors and proprietors of houses, in proportion to their real rent. See SCOTLAND, CHURCH OF; see also DISSENTERS, and PARISH. [By an act passed in 1868, the compulsory collection of church rates was abolished, and provision was made for the administration, by a body of Church Trustees, of such contributions as may be voluntarily agreed to, and of donations and bequests made for ecclesiastical purposes in the parish.]

CHURCH ROAD. See under the article HIGHWAY.

CHU'RCH-WARDENS, in England, are ecclesiastical officers, elected sometimes by the parishioners and minister jointly, sometimes by the minister alone, and sometimes by the parishioners alone, for the purpose of protecting the edifice of the church, superintending the celebration of public worship, and to form and execute

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other parochial regulations. They are generally two in number. See CHURCH-RATES, PARISH, VESTRY.

CHU'RCHILL, Charles, an English poet, now remembered almost as much for his profligacy as for his poetry, was born at Westminster, where his father was a curate, in 1731. He was educated at Westminster School, and in his 17th year made a clandestine marriage. In 1756 he was ordained, and two years afterwards, succeeded, his father as curate of St John's, Westminster. Soon after his transference here, he fell into habits very ill-becoming his clerical character. In 1761, he published (at his own risk, the booksellers having refused him five guineas for it) "The Rosciad," a satire on theatrical managers and performers, which displayed much critical acumen, clever sarcasm, and no little humor, and enjoyed such an immense success, that C., who on its publication had withheld his name, was soon delighted to avow himself author. In the same year appeared "The Apology," a bitter satire on some of his critics, which added alike to his purse and his notoriety. He now totally neglected the duties of his office, was a constant attender at theatres, and altogether led a most dissolute life. His parishioners were scandalised, and his dean remonstrated, whereupon C., to shew his utter contempt for the ministerial profession, appeared in a blue coat, gold-laced hat and waistcoat, and large ruffles. He was obliged, however, to resign his preferment, which pecuniary sacrifice was little, as his works brought him considerable sums. He further displayed the complete licentiousness of his nature by separating from his wife, and seducing the daughter of a tradesman in Westminster, and by endeavoring to excuse his vices in a poem called "Night," on the ground that avowed profligacy was more harmless than profligacy practised in concealment. The boon-companion of as great a debauchee as himself—Wilkes—he contributed to the pages of the "North Briton;" among other things, "The Prophecy of Famine," "A Scots Pastoral," one of the best of his satires. Among his other works, all more or less satirical, are the "Epistle to Hogarth," "The Author," "The Candidate," "The Ghost," "Gotham," "The Duellist," &c., of which "The Author" is the best. He died November 4, 1764, while on a visit to Wilkes at Boulogne. C.'s thorough reprobacy has naturally led to an unjust depreciation of his poetical abilities. See "Poetical Works," by Took (1867), with "Life" by Hannay.

CHURCHING OF WOMEN, a religious usage prevailing in the Christian Church from an early period, of women, on their recovery after child-bearing, going to church to give thanks. It appears to have been borrowed from the Jewish law (Lev. xii. 6). In the church of the early ages, it was accompanied with various rites; and in the Church of Rome and Greek Church, it is imperative. In the Church of England, also, a service for the C. of W. finds a place in the Liturgy. By the Presbyterian and Independent churches of Britain, it is rejected, as having no scripture warrant.

CHU'RCHYARD. See BURIAL, CEMETERY.

CHURN, a machine for agitating milk or cream for the production of butter. The principle of the operation is considered in the article on Butter. Of the great variety of forms that have been given to the machine, it is very difficult to determine which deserves the preference. It is obvious that the more thorough and uniform the agitation, the more completely will the butter be separated from the milk. The consistency and color of the butter are also elements in judging of the relative merits of churns. The temperature of the air and the milk affect the butter in these respects. During summer, that of the milk should not exceed 62°, and in very hot weather may be under 60°. During cold weather, the milk should be about 2° higher when put into the churn. The speed at which the operation is performed also influences the result. Trials instituted to test the relative merits of churns have failed to settle which is the best form for actual use in the dairy; for the same machine under different conditions does not always yield the same result. The oldest form is the upright or *plunge* churn. There is a general prejudice in favor of this form of C., on the ground that the butter is more completely separated and of better quality. Its great defect is that the operation, being generally performed by hand, is fatiguing. Recent improvements have chiefly aimed at ease in working, and a saving of time. The original *barrel* C., with a rotatory motion, like a grindstone, which motion was reversed every few rounds, has fallen from its once high repute

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into comparative neglect. An improvement on the barrel C. was the making of the barrel stationary, the milk being agitated by internal apparatus fixed on a horizontal spindle which is turned by a winch handle. Barrel churns, sometimes of monster size, are generally used in large dairies in Holland. For small or moderate-sized dairies, perhaps the most suitable is the *box* C., consisting of a cubical or oblong box, of birch or plane tree, having the agitators fixed on a horizontal spindle. Churns on a centrifugal action have also been successfully used, particularly in Sweden. More recently, churns of a barrel form, with an oscillating motion like a child's cradle, have been introduced, but without any decisively superior results.

To all forms of churns, power other than manual can be, and is applied. In some parts of the continent of Europe, and in America, the dog is employed in churning by means of a contrivance like a squirrel's box. Horse-power is in very general use in large dairies in Great Britain. In very exceptional cases, steam-power is used.

CHU'RRUS. See HEMP.

CHUSA'N, an island on the east coast of China, 40 miles n.-e. from Ningpo, in 30° 40' n. lat., and 121° 48' e. long., of an oblong shape, and about 50 miles in circumference. It is mountainous; but has many fertile valleys, with a plentiful supply of water, and is very carefully cultivated by the hardy and independent people by whom it is inhabited. Mr. Fortune was struck with the richness of its flora. Azaleas clothe the mountains; clematises, roses, and honeysuckles grow in great luxuriance. The camphor and tallow tree, and many varieties of bamboo, are found in the valleys. Tea is cultivated to some extent on the hill-sides. For three-fourths of the year, the climate is temperate. June, July and August are the hot months. In August, the thermometer averages 83°, but in January and February it is often as low as 20°. Ting-hai, the capital, a walled town about two miles in circumference, containing a fine specimen of Buddhist temple-architecture, surrendered to the British forces, July 5, 1840, and was retaken by them (having been evacuated the previous February) October 1, 1841. At the close of the war, the island was delivered up to the Chinese. In 1860, it was again occupied by British troops, but restored by the convention of Pekin. Pop. about 200,000.

CHUSAN ISLANDS, a group of islands scattered round the one described above. The most remarkable of these is the sacred island of Pu-tu, lying east from Chusan. It is covered with Buddhist temples, pagodas, and monasteries, which latter are inhabited by a great number of Bonzes, as the Chinese priests are called. The island is devoted exclusively to religious purposes, and no layman is allowed to reside upon it.

CHU'TNEE, or Chu'tny, an East Indian condiment, very largely used in India and to a considerable and increasing extent in Great Britain. Indian C. is a compound of mangoes, chillies or capsicum (q. v.), and lime-juice, with some portion of other native fruits, such as tamarinds, &c., the flavor being heightened by garlic. It is sometimes manufactured for sale in England, but not in any quantity. Families occasionally make it for their own use, and employ the following ingredients: Chillies, 1—1½ lb.; apples, 1 lb.; red tamarinds, 2 lbs.; sugar-candy, 1 lb.; fresh ginger root, 1½ lb.; garlic, ½—¾ lb.; sultana raisins, 1½ lb.; fine salt, 1 lb.; distilled vinegar, 5 bottles. The chillies are to be soaked for an hour in the vinegar, and the whole ground with a stone and muller to a paste.

CHYLE. The food undergoes various changes in the alimentary canal, which will be fully noticed in the article on DIGESTION. One of these changes is its conversion in the stomach into a pulpy mass termed *chyme*. The chyme, which passes onward into the small intestine, is acted upon by the bile, pancreatic fluid, and intestinal juice, and through their influences is separated into the *chyle*, which is absorbed or sucked up by the lacteals (q. v.) and into matters unfit for nutrition, which ultimately find their way out of the system by the intestinal canal. The mode in which this nutritious C. is taken up by vessels distributed over the small intestines, and the changes which it undergoes before it is converted into true blood, are described in the articles LACTEALS, THORACIC DUCT, and NUTRITION. We shall here merely notice its leading physical and chemical properties. When obtained from the thoracic duct of an animal that has been killed while the process of digestion was going on (especially if it had taken fatty food), the C. is a white,

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milky-looking, yellowish fluid, with a faintly alkaline reaction. Like the blood, it coagulates in about ten minutes after its abstraction from the body of the animal; and in about three hours a small but distinct gelatinous clot is separated from the serous fluid of the chyle.

On examining C. under the microscope, we find that it contains enormous numbers of minute molecules (probably consisting of fat), together with nucleated cells, which are termed the chyle-corpuscles, and are apparently identical with the white or colorless blood-cells. The chemical constituents of C. are much the same as those of blood; fibrin, albumen, fat, extractive matters, and salts being the most important.

CHYLI'FEROUS SYSTEM. See LACTEALS and THORACIC DUCT.

CHYME. See CHYLE and DIGESTION.

CIALDINI, Enrico, son of Giuseppe Cialdini, civil engineer in the Modenese service, was born at Castel Vetro, in that duchy, August 10, 1813. Incurring the displeasure of his Jesuit preceptors, he was sent by his parents, who designed him for the medical profession, to study at the university of Parma. When the abortive insurrection of 1831 broke out in the duchies, C. joined the volunteers of Regio; and on the capitulation of Ancona, embarked for France. Here he resumed his medical studies, living in the Rue de la Harpe, and eking out his scanty means by translating for the booksellers. The struggles against absolutism in the Iberian Peninsula opened anew the career of arms to the Italian exiles. He determined to join the legion raised by Don Pedro in France against the Miguelists. A severe attack of cholera delayed his departure till March 1833, when he sailed for Oporto with letters of introduction from several Parisian notabilities. Arrived off the port, he threw the letters into the sea, determined to trust to his merit alone, and enlisted as a private in the 2d Regiment, composed mainly of Italian refugees. His great personal courage soon secured his promotion; and the unanimous vote of his comrades pronounced him the worthiest man to receive the Order of the Tower and Sword decreed by the government to his company.

After the capitulation of Evora, C. joined (October 22, 1835) the legion of Oporto, formed under Borso di Carminati for service in Spain. In this force, in which Fanti and Durando were officers, C. gained further honors. At Cherta he received the Cross of San Ferdinand; and in the retreat from Morella, by a great effort of strength and courage, saved the life of his brother Guido. In 1839, he exchanged, with some sacrifice of rank, into the regular army, in which, at the close of the war, he found himself captain with another decoration. The fact that some of his old chiefs conspired against Espartero in 1841, seems to have caused him to be sent on half-pay to Valencia, where he married a lady of good family. In 1843, he followed Narvaez in his march against Madrid; was made by him colonel of the regiment of St. Ferdinand; and afterwards employed in organising the Civil Guard on the model of the French *gendarmerie*. He was in this force when Charles Albert headed the Italian rising in 1848. A bold and loyal soldier, C. had always kept aloof from the plots of the secret societies; but now he at once threw up his appointments in Spain, and hurried to Italy, arriving in time to aid his old comrade Durando in the defence of Vicenza. Here he received a dangerous wound, and fell into the hands of the Austrians. On his release, he was employed by the Sardinian government in the arduous task of reducing to regular discipline the unruly volunteers from the duchies. He succeeded at last, and fought well at the head of his new regiment in the brief campaign of 1849. During the ten years that elapsed from the defeat of Novara to the renewal of the war in 1859, C. was actively employed. In the Crimea, he commanded the 3d division of the Sardinian Contingent; and on his return was appointed inspector-general of Bersaglieri and aide-de-camp to the king—a rare distinction for a man of plebeian origin. He was entrusted by Cavour with the formation of the famous Cacciatori delle Alpi, placed under the command of Garibaldi after the declaration of war, and co-operated actively with them at the head of the 4th division. The victory at Palestro was his chief exploit, the further progress of the Italians being stopped by the peace of Villafranca. In 1860, the success of Garibaldi in the south, and the formation of a papal army, led to the intervention of Piedmont. Fanti entered the States of the Church with two divisions, one of which was under the command of Lieutenant-general Cialdini. The cam-

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paign thus commenced was the most brilliant in C.'s history. He reduced Pesaro; intercepted by a prompt and skilful movement, the march of Lamoriciere on Ancona; defeated him at Castelfidardo, and compelled Ancona to surrender. Then turning southwards, where the irregular forces of Garibaldi were beginning to weary before a first-class fortress and a veteran army, he defeated the troops of Francis II. on the Garigliano. Diplomacy delayed the fall of Gaeta till February 13, 1861, when it yielded to C. after a vigorous bombardment, as did the citadel of Messina shortly afterwards. Turin erected a statue to C. (*Vincitore Sempre*), and Reggio elected him deputy in April. In the following summer he was sent as governor to Naples; but was relieved in a few months at his own request. He had also to act against Garibaldi on the occasion of the second Sicilian expedition. When the army of Italy was reorganized in 1863, C. was appointed to one of the chief commands. Senator in March 1864, he signalised himself by his brilliant speech in favor of the transfer of the capital (Dec. 1864). In the war of 1866, the advice of La Marmora was followed, and the defeat of Custoza was the result. Before a new campaign could be fairly opened, the cession of Venetia put an end to active operations. C. was appointed chief of the staff on the resignation of La Marmora. In 1867, C. was intrusted by the king with the formation of a new ministry, but failed; and in the same year he was made commander-in-chief of the troops in Central Italy.

CIBBER, Colley, was born on the 6th November 1671, in London. He was sent to the free school at Grantham, in Lincolnshire, in 1682. Five years thereafter, he returned to London, and 1688 was a volunteer in the forces raised by the Earl of Devonshire in support of the Prince of Orange. He afterwards conceived a passion for the stage, and after performing gratuitously for several months, he succeeded in obtaining an engagement at 10*s.* per week, which was raised to 15*s.*; and on the commendation of Congreve, who had witnessed his performance of Lord Touchwood, five additional shillings per week were added. Incited by this magnificent success, he, at the age of 22, married Miss Shore, to the great rage of her father, who revenged himself by spending the greater portion of his fortune in the erection of a retreat on the banks of the Thames. After marriage, C., discovering that 20*s.* per week was a somewhat insufficient income for an elegant gentleman and an elegant gentleman's wife, was induced to add thereto by the writing of comedies, some of which were remarkably successful. In 1711, he became one of the patentees in the management of Drury Lane, and remained in connection with that theatre till 1730; when, on being appointed poet-laureate, he sold his interest in the business. He was, however, sometimes tempted back to the stage by an offer of 50 guineas a night. C. wrote and adapted many plays, but as an author he is best known by his "Apology." He died suddenly on the 12th December 1757.

CI'BOL. See ONION.

CIBRA'RIO, Luigi, an Italian historian and politician, was born at Turin, 23rd February 1802. He studied at the university of that city, where he took his degree in 1824, as Doctor of Laws. Devoted to historical investigations, he secured a reputation in this important department, at a very early period. In 1825 appeared his "Notizie sulla Storia dei Principi di Savoia;" in 1826, his "Notizie di Paolo Simone de Belli;" and in 1827, his "Delle Storie di Chieri Libri IV." King Charles Albert—with whom he was always a great favorite—frequently employed him in diplomatic service, and in 1848, when Italy rose against the Austrians, appointed C. extraordinary royal commissioner at Venice. During the same year, he was created a senator of the kingdom. When Charles Albert—after the unfortunate issue of the war—went to live in voluntary exile at Oporto, C. was sent by the Sardinian senate to induce him to return. He wrote an account of his unsuccessful mission, entitled "Ricordi d'una Missione in Portogallo al Re Carlo Alberto" (1850). During his public career, however, C. did not neglect his early and favorite pursuits. In 1839, he published his "Della Economia Politica del Medio Evo;" in 1840, his "Storia della Monarchia di Savoia;" in 1844, his "Storia e Descrizione del a Badia d'Altacomba;" and in 1847, his "Storia di Torino." But the new life and energy which Sardinia began to manifest under Victor Emmanuel had its claims on his public usefulness. In 1850 he was appointed Superintendent-general of Customs, and while occupying this office introduced several important reforms. Subsequently, he was intrusted with

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full powers to negotiate a treaty of commerce with France, in which he distinguished himself notably by his advocacy of the principles of free trade. In 1852 he was made Minister of Public Instruction, and, in 1855, Minister of Foreign Affairs. When Cavour took his department into this own hands, C. became first secretary o the king. In 1857, he was appointed President of the Telegraphic Congress of Turin. In 1860, C. again made a most successful appearance as an author, in his "Operette Varie" (Torino), and in his "Jacopo Valperga di Masino, Cancelliere di Savoya." He died at Salo, in the province of Brescia, 1st October, 1870.

CICA'DA, a genus of insects of the order *Hemiptera*, sub-order *Homoptera*, remarkable for the sounds which they emit, the loudness which is very extraordinary, when considered with reference to the size of the creatures producing them. The largest European species are only about an inch long. The elytræ or wing-covers, of the cicadæ are almost always transparent and veined. They dwell on shrubs and trees, of which they suck the juices. The male insects alone possess the organs of sound perfectly developed. These are in no way connected with the mouth or throat, but may be described as a musical apparatus on the under side of the abdomen. This apparatus is very complicated, consisting of a set of membranes and fibres connected with powerful muscles. The sound can be produced even after the insect has been long dead, by pulling the fibres, and letting them escape. Cicadas are most common in tropical and warm temperate regions, and are scarcely known in Britain, although one or two species have been found in the south of England. The ancients regarded the sounds of these insects as types of music and eloquence. In some countries they bear names which signify that sleep is banished by their din. The sounds produced by some of the South American species, which are much larger than the European, are loud enough to be heard at the distance of a mile, and have been likened to the sound of a razor-grinder at work. The Greek name of the C. is *tettix*. often erroneously translated grasshopper. These insects have indeed no resemblance to grasshoppers, and no power of leaping. C. is the Latin name. The modern Italian is *cicale*, the French *cigale*. Byron speaks of the "shrill cicalas."

CICATRISA'TION (Lat. *cicatrix*, a scar), the process of healing or skinning over of an ulcer or broken surface in the skin or in a mucous membrane, by which a fibrous material, of a dense resisting character, is substituted for the lost texture The new tissue, in such a case, is called the cicatrix, and usually resembles, to a considerable extent, the structure which it replaces; it is, however, less elastic, and from its shrinking in volume, sometimes produces an appearance of puckering. The glands and other special structures of the original tissue are wanting in the cicatrix, which, however, performs perfectly well, in most instances, the office of protection to the parts below the surface. See INFLAMMATION and ULCERATION.

CI'CELY (*Myrrhis*), a genus of umbelliferous plants, nearly allied to Chervil, of which one species, SWEET C. (*M. Odorata*), is common in the central and southern parts of Europe, and in similar climates in Asia, but in Britain is so generally found near human habitations, that it appears probably to have been introduced. It is sometimes called *Sweet Chervil*, and in Scotland *Myrrh*. It is a branching perennial, two feet high or upwards, with large triply pinnate leaves and pinnatifid leaflets, somewhat downy beneath; the fruit remarkable for its large size, and, as well as the whole plant, powerfully fragrant, the smell resembling that of anise. The seeds, roots, and young leaves are used in Germany and other countries in soups, &c. The plant was formerly much in use as a medicinal aromatic.

CI'CER. See CHICK PEA.

CI'CERO, Marcus Tullius, the greatest orator of Rome, and one of the most illustrious of her statesmen and men of letters, was born at Arpinum on the 3d of January, in the year 106 B.C. He belonged to an ancient family of the equestrian order, and possessed of considerable influence in his native district. His father, himself a man of culture, and desirous that his son should acquire an eminent position in the state, removed him at an early age to Rome, where, under the direction of the orator Crassus, he was instructed in the language and literature of Greece, and in all the other branches of a polite education. In his sixteenth year he assumed the manly gown, and was introduced to the public life of a Roman citizen. He now

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acquired a knowledge of law, and underwent a complete course of discipline in oratory. At the same time he studied philosophy under three successive preceptors, of the Epicurean, Academic, and Stoic schools, and neglected no mental exercise, however arduous, which might conduce to his future eminence; being thus early of the opinion which he afterwards maintained in his treatise "De Oratore," that an orator should possess almost universal knowledge. With the exception of a brief campaign under Sulla in the Social War, he passed his time in these preliminary studies until his 26th year, when he began to plead in public. In one of his earliest causes he distinguished himself by defending the rights of Roscius, a private citizen, against one of the favorites of Sulla, who was then dictator. Soon after, for the benefit of his health and in order to his improvement in elocution, he travelled to the chief seats of learning in Greece and Asia, and on his return was regarded as second to no orator at the Roman bar. Having been elected quæstor (76 B.C., he was appointed by lot to a government in Sicily, a post which he filled with great ability, and to the entire satisfaction of those whom he governed. Some years after his return, he laid the Sicilians under still greater obligations by his successful prosecution of their prætor, Verres, against whom he prepared no less than six orations, although the first had the effect of disheartening the accused so effectually, that he voluntarily retired into exile. Passing, at short intervals, through the offices of ædile (69 B.C.) and prætor (66 B.C), he was at length elected, by an overwhelming majority, to the consulship. His tenure of office was rendered memorable by the conspiracy of Catiline, which he frustrated with admirable skill and promptitude. See CATILINE. The highest praises were showered upon C.; he was hailed by Cato and Catulus as the "Father of his Country;" and public thanksgivings in his name were voted to the gods. But his popularity did not last long after the expiry of his consulship. His enemies charged him with a public crime, in having put the conspiring nobles to death without a formal trial, and he found it necessary to leave Rome, and went to reside in Thessalonica (58 B.C.). A formal edict of banishment was pronounced against him, but he was recalled from exile in about 16 months, and on his return to Rome was received with great enthusiasm. His recovered dignity, however, soon excited the envy of the honorable party in the senate, with whom he had desired to make common cause; while Pompey and Cæsar, the greatest powers in the state, and from whose enmity he had most to dread, courted his alliance and co-operation. Thus, while preserving an appearance of independence, he was betrayed into many actions which he could not but regard as ignominious, and which, by increasing the power of the triumvirs, led indirectly to the ruin of the republic. A remarkable exception to this servile conduct is to be found in his assisting Milo when suing for the consulship, and defending him, against the wish of Pompey, and in spite of the hostile feeling of the populace, after he had slain Clodius in an accidental rencounter. During this period, he composed his works, "De Oratore," "De Republica," and "De Legibus." After a year's admirable administration of the province of Cilicia (51—50 B. C.), he returned to Italy on the eve of the civil war. With the convictions which he avowed, there was but one course which it would have been honorable for him to pursue—to enlist himself, at all hazards, on the side of Pompey and the republic. But instead of this he hesitated, balanced the claims of duty and of interest, blamed Pompey for his want of preparation, and criticised the plan of his campaign. At length he joined the army of the senate, but, after the battle of Pharsalia, abruptly quitted his friends, and resolved to throw himself upon the generosity of the conqueror. After nine months' miserable suspense at Brundusium, he was kindly received by Cæsar, whom he followed to Rome. During the years which ensued, he remained in comparative retirement, composing his principal works in philosophy and rhetoric, including those entitled "Orator," "Hortensius," "De Finibus," "Tusculanæ Disputationes," "De Natura Deorum," "De Senectute," "De Amicitia," and "De Officiis." On the death of Cæsar, he was disposed to unite his interests with those of Brutus and the other conspirators, but was restrained by dictates of prudence. In the commotions which followed, he espoused the cause of Octavianus, and gave utterance to his celebrated philippics against Antony. These orations were the occasion of his death. When Octavianus and Lepidus joined with Antony in a triumvirate, C. was among the proscribed; and his life was relentlessly sought. The soldiers of Antony overtook him while his attendants were bearing

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him, now old, and in an infirm state of health, from his Formian villa to Caieta, where he intended to embark. He met his death with greater fortitude than he had supported many of the untoward incidents of his life. Desiring his attendants to forbear resistance, he stretched forward in the litter, and offered his neck to the sword of his executioners. He died in the 63d year of his age, on the 7th December, 43 B. C.

The character of C. is one which it is not difficult to estimate. Really a lover of virtue, no one could follow in her footsteps with greater dignity when attended by the popular applause. But he was weak enough to yield to the depraved spirit of his times, and to act according to his convictions only when they were not evidently discordant with his private interests. Few men, possessing such talents, have been so utterly devoid of anything approaching to heroism. As a statesman, it would be unjust to deny his legislative abilities; but he was generally deficient in courage and resolution. He was one of the greatest masters of rhetoric that have ever lived. His orations were the result of consummate art, combined with unwearied industry, and survive as characteristic memorials of a time when eloquence, far more than at present, was a power which bent the verdicts of judicial tribunals, and influenced the decrees of the state. In philosophy, he does not rank with the original thinkers of antiquity; nor, in truth, did he aspire to do so. His writings on speculative subjects are chiefly valuable on account of the noble and generous sentiments which they contain, and as reflecting the varied thought of the different schools. The best edition of his collected works is Orelli's (9 vols. 8vo, 1826—1837). See Forsyth's Life of C. (1864).

CICERO'NÉ (from Cicero, the orator or speaker), a guide, usually for the purpose of shewing the curiosities and works of art in a town to strangers. Cicerones are of all degrees, from distinguished archæologists, who undertake the office as a favor, to the humble *laquais de place*, who, though quite indispensable on a first arrival, is too often both incompetent and dishonest. The stranger ought to be particularly on his guard against allowing a C. to make purchases for or even with him, as the practice of adding a commission to him to the price charged now prevails probably in every country in Europe.

CICHO'RIUM. See CHICORY and ENDIVE.

CICINDE'LA, a genus of insects of the genus *Coleopteru*, section *Pentamera*, the type of a large family, *Cicindelidæ*. This family is nearly allied to *Carabidæ*, and the insects belonging to it are among the most voracious of those beetles which, both in their perfect and larva state, prey on other insects. They have a strong head, with projecting toothed mandibles, and are particularly distinguished by a sort of hook or nail, which is articulated by its base to each of the lower jaws or maxillæ. They are more abundant in tropical than in cold countries; a few species, none of them large, are found in Britain. The head of the larva is large, concave above, and the back furnished with two remarkable hooked spines, which are said to be used as anchors to fix it at any part it chooses of its burrow in the earth; whilst the soil which it excavates, is carried to the mouth of the burrow in a sort of natural basket formed of the concave back of the head and the recurved mandibles. The larva lies in wait in its burrow, its head just level with the ground, till its prey comes within reach, upon which it suddenly rushes.—*C. campestris*, a green species with whitish spots, is common in most parts of Britain, in dry sandy places exposed to the sun.

CICI'SBEO is the name given in Italy to the professed gallant or constant attendant upon a married lady. In the higher ranks of Italian society, it was at one time considered unfashionable for the husband to associate with his wife anywhere except in his own house. In society, or at public places of amusement, the wife was accompanied by her C., who attended at her toilet to receive her commands for the day. This custom, which was once universal, and which naturally gave rise to much scandal, has now almost disappeared. C. is synonymous with *cavaliere servente*.

CICO'NIA. See STORK.

CICUTA. See HEMLOCK.

CID CAMPÉADOR is the name given in histories, traditions and songs to the

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most celebrated of Spain's national heroes. There is so much of the mythical in the history of this personage, that hypercritical writers, such as Masdeu, have doubted his existence; but recent researches, more particularly those of Dozy, and the investigation of newly discovered Arabic sources, have succeeded in separating the historical from the romantic. See Dozy's "Récherches sur l' Histoire Politique et Littéraire de l' Espagne pendant le moyen âge" (Leyden, 1849). The following is the result of those inquiries: Roderigo Ruy Diaz (Roderic the son of Diego) was descended from one of the proudest families of Castile. His name first appears in a document written in 1064, during the reign of Ferdinand of Leon. Under Sancho II., son of Ferdinand, he became standard-bearer and commander of the royal troops. In a war between the two brothers, Sancho II. and Alfonso VI. of Leon, it was a stratagem of Roderic's—which, according to modern notions, was anything but honorable—that secured the victory of Sancho at Llantada (1068) over his brother, who was forced to seek refuge with the Moorish king of Toledo. He appears at this time to have already been called the *Campeádor*, a word supposed to answer to our champion.

Upon the assassination of his friend and patron, King Sancho, he required the next heir, Don Alonzo, to clear himself by oath of any participation in his brother's murder, ere the nobles of Leon and Castile should do homage to him. By this act, he incurred the new monarch's enmity; an enmity which, however, the king's policy concealed in the hour of danger, and he even consented to Roderic's marriage with his cousin Ximena,—daughter of Diego, Duke of Asturia. But when the king thought the services of Roderic no longer necessary to his own safety, he lent a willing ear to the latter's personal enemies, and banished him in 1081. Roderic then joined the Moorish kings of Saragossa, in whose service he fought against both Moslems and Christians. It was probably during this exile that he was first called the Cid or Sid, an Arabic title which means lord. He frequently defeated the king of Aragon and the Count of Barcelona, the latter of whom, Berenguer Ramon II., he took prisoner.

He was again reconciled to the king, but only for a short time, when he was condemned to a second exile. In order to support his family and numerous followers, he now saw himself forced to carry his sword against the Moors, over whom he gained a victory, and established himself as sovereign or lord of Valencia (1094). He retained possession of Valencia five years, during which time he took many neighboring fortresses. He died of grief in 1099, on learning that his relative and comrade in arms, Alvar Fañez, had been vanquished by the Moors, and that the army which he had sent to his assistance had been defeated near Alcire. After the Cid's death, his widow held Valencia till 1102, when she was obliged to capitulate to the Almoravides, and fly to Castile, where she died in 1104. Her remains were placed by those of her lord in the monastery of San Pedro de Cadeña. The Cid had a son, who was slain by the Moors in a battle near Consuegra. He also left behind him two daughters, one of whom was married to the Count of Barcelona; the other to an infant of Navarre, through whom the kings of Spain and many royal houses of Europe claim kindred with "*Mio Cid el Campeador.*" Relics of the "Blessed Cid," as he is still called in Spain, such as his sword, shield, banner, and drinking-cup, are still held in great reverence by the populace. The numerous *Cid romances* that were first published in the 16th c. contain the most romantic improbabilities concerning the life and deeds of the Cid. See "Silva de Varios Romances" (1550), and "Romancero General" (1604). These romances were taken from the ancient *centares* (national songs) and *poemas*, most of which are entirely lost. The most important of modern works on this subject, besides that of Dozy above mentioned, are Huber's "Geschichte des Cid," &c. (Bremen, 1829), and Southey's fascinating "Chronicle of the Cid" (Lond. 1808). The former of these is, however, the more valuable in a historical point of view.

CI'DARIS, a genus of *Echinidæ* (q. v.), or Sea urchins, closely allied to the genus *Echinus* itself, and included along with it in a family or tribe called *Cidarites*, in which the mouth and anus are opposite to each other—the mouth below, and the anus above. Only one species, *C. papillata*, has been found in the British seas, and that only on the coasts of Zetland. The Zetlanders call it the *Piper*, from a resemblance which they trace in its globe and spines to a bagpipe. They say that it is

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sometimes found with spines a foot long. The markings of the shell and spines are extremely beautiful.

CI'DER is the fermented juice of apples, and is extensively prepared in Gloucestershire and other parts of England, in Ireland, in the northern districts of France, and in North America. In Normandy, a vast number of varieties of acid or bitter-apples are grown for the preparation of cider. The apples are first bruised in a circular stone-trough or *chase*, by a similarly shaped stone or *runner*, which revolves by machinery in the interior of the trough. The pulp so obtained is placed in sieve-bags made of hair-cloth or reed-straw, and subjected to pressure, which yields a dark-colored sweet liquid, and leaves in the bag a somewhat dry residue, consisting of the pips, skin, and other fibrous parts of the apple. The apple-juice passes first into a shallow tub or *trin*, and is almost immediately placed in casks in a cool place, when fermentation begins, part of the sugar is converted into alcohol, and in a few days, a clear liquid is obtained, which can easily be racked off from sedimentary matter. C. is largely used in England as a beverage, and is very palatable and refreshing. It contains from 5¼ to 9 per cent. of alcohol, and is therefore intoxicating when drunk in quantity. It does not possess the tonic and nourishing properties, however, of bitter-beer. C. quickly turns sour, becoming *hard* C., owing to the development of lactic acid, and great difficulty is experienced in the attempt to preserve it.

CIEZA, a town of Spain, in the province of Murcia, 26 miles north-west of the city of that name. It is situated on an eminence near the river Segura, overlooking a plain of great fertility. The streets are tolerably wide and well-paved: and there are manufactures of linen, hempen fabrics, wine and oil; and silkworms are reared. Pop. 9500.

CIGA'RS. See TOBACCO.

CI'GOLI, Ludovico Cardi da, an eminent painter of the later Florentine school, which, about the end of the 16th c., developed, in opposition to the languid mannerists of the time, a peculiar *eclectic* style of Art. C. was born at Empoli in 1559. His model was Correggio; but as the latter was deficient in design, and in a scientific knowledge of perspective, C. endeavored to unite these with the warm bright coloring and wonderful chiaroscuro of Correggio. He was invited by Clement VII. to Rome, where he died in 1613. Among C.'s most famous pictures may be mentioned—"The Healing of the Lame Man" (St Peter's, Rome), "The Martyrdom of St Stephen" (Uffizi Gallery, Florence), "Tobias in the Act of Thanking the Angel" (St Petersburg), and "St Francis," a favorite subject with Cigoli (Pitti Palace, Florence). C. was also held in high estimation as an architect, and designed several of the Florentine palaces.

CI'LIA (Lat. Eyelashes), a term variously employed in botany and zoology to designate fringing hairs or hair-like processes. Thus, the margins or nerves of leaves, petals, &c., are often described as *ciliated* or furnished with cilia. The fine thread-like processes which surround the opening of the fruit of many mosses, are called C.; but these processes, when broader, are denominated teeth.—The description and uses of C. in the animal kingdom are given in the article EPITHELIUM.

CILI'CIA, an ancient division of Asia Minor, now included in the Turkish eyalet of Koniah. The Taurus range, which separated it from Capadocia, bounded it on the n., the Gulf of Issus and the Cilician Sea on the s., while the Amanus and Pamphylia bounded it respectively on the e. and w. Lat. 36°—38° n., long. 32° 10'—37° 8' e. The eastern portion of C. was fertile in grain, wine, &c.; while the western and more mountainous portion furnished inexhaustible supplies of timber to the ancients. The pass called by the Turks Gölek Bóghâz, is that by which the younger Cyrus passed from Tyana in Cappadocia to Tarsus; and it is also the same by which Alexander the Great entered Cilicia. Pop. about 100,000, mostly nomadic.

In early ages C. was ruled by its own kings, the dynasty of Syennesis being apparently the most important. The Cilicians were a distinct people in the time of Xenophon; but the Greeks appear to have got a footing after the time of Alexander. The Cilicians were notorious pirates, but having carried on their depredations too close to the shores of Italy, the Roman arms were turned against them, and C. was made a Roman province in Pompey's time.

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CIMABU'É, Giovanni, one of the restorers of the art of painting in Italy, which had fallen into neglect during the barbarism of the dark ages, was born at Florence in 1240. At this time, the fine arts were practised in Italy chiefly by Byzantines, and had degenerated into a worn-out mechanical conventionalism. C. at first studied under Byzantine masters, and adopted their traditional forms, but gradually excelled his teachers, made innovations on the fixed patterns set before him, and gave life and individuality to his works. Two remarkable pictures of the Madonna by C. are still preserved in Florence—one (chiefly Byzantine in style) in the Academy; the other, displaying a more purely original genius, in the church of Santa Maria Novella. It is said that this latter work is the time of C. was admired as a miracle of art, and was carried to the church in a sort of triumphal procession. More remarkable pictures, in point of expression or dramatic effect, are found in C.'s frescoes in the church of San Francisco at Assisi. C. died soon after 1300. What strikes one as very wonderful about C.'s pictures, is the accuracy of his naked figures, considering that he had no better professional guides than the Byzantine artists. His draperies were also very good, but he had apparently no knowledge of perspective, though acquainted with architecture. His greatest pupil was Giotto (q. v.).

CIMARO'SA, Domenico, an Italian composer of operas, was born at Naples in 1755, and was educated in music under Sacchini, and in the conservatory of Loretto. His first pieces were the "Sacrificio di Abramo" and the "Olympiade." When barely 22, he had achieved a reputation in all the leading Italian theatres. He was then called to St Petersburg, where he resided four years. Afterwards, he lived at various German courts; thence he proceeded to Vienna, where he became imperial chapel-master; and finally, he returned to Italy. At Naples, his comic opera, "Il Matrimonio Segreto," composed at Vienna, 1791, was repeated 57 times in succession. C. died at Venice in 1801. His comic operas are remarkable for their novelty, spirit, whimsicality, and liveliness of idea, as well as for their great knowledge of stage-effect. The wealth and freshness of his invention gave rise to the saying, that one finale of C. contained material for a dozen operas.

CI'MBALO, a musical instrument with a set of keys like the clavecin or harpsichord.

CI'MBRI, or Kimbri, a people who issued from the north of Germany in conjunction with the Teutones, and first came into hostile contact with the Romans in the Eastern Alps in 113 B.C. They were victorious in several great engagements, and were only prevented from devastating Italy by sustaining a terrible defeat from Marius, on the Raudii Campi, near Verona, or, according to others, near Vercelli, in August 101 B.C. Their infantry fought with their shields fastened together by long chains; their horsemen, of whom they had 15,000, were well armed with helmet, coat of mail, shield, and spear. Marius had so chosen his position that the sun and dust were in their faces, and yet they contested the victory most bravely with the Romans, who were 55,000 strong. When the battle was lost, the women, who remained in the camp formed of the wagons, killed themselves and their children. 140,000 C. are said to have fallen in the battle; the number of prisoners is given at 60,000. It is not till long afterwards, when the Romans themselves penetrated into Germany, that the name of the C. again appears. Cæsar represents the Aduatici of Belgium as the descendants of the C. and Teutones. Tacitus speaks of a people, bearing the name of C., few in number, but of great reputation, that sent ambassadors to Augustus. This people lived in the extreme north of Germany, on the borders of the ocean; according to Pliny and Ptolemy, at the extremity of the peninsula called from them the Cimbric Chersonese, now Jütland. The ethnology of the C. is doubtful. Greek writers associated them groundlessly with the Cimmerians (q. v.); Sallust calls them Gauls; Cæsar, Tacitus, and Plutarch looked upon them as Germans, and the opinion of their German origin has been adopted by most moderns. Yet H. Müller, in his "Marken des Vaterlands" (1837) has endeavored to shew that they belonged to the Celtic race, and lived originally on the north-east of the Belgæ, of kindred origin; and that their name is the same as that by which the Celts of Wales designate themselves to this day—*Cymri*.

CI'MEX and Cimi'cidæ. See BUG.

CIMI'NNA, a town of Sicily, in the province of Palermo, 18 miles south-east of the city of that name. Pop. (1871) 5721.

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CIMMERIANS, or Cimmerii, in the poems of Homer, the name of the people dwelling beyond the ocean-stream," where the sun never shines, and perpetual darkness reigns.—But the historic C. were a people whose country lay between the Borysthenes (Dnieper) and the Tanais (Don), including also the Tauric Chersonesus (Crimea). The Cimmerian Bosporus (Strait of Yenikale) derived its name from them. Being driven out by the Scythians, they migrated to Asia Minor, dwelt there for some time, plundered Sardis, failed in an attempt upon Miletum, and were finally routed and expelled by the Lydian king Alyattes, some time after 617 B. C.

CI'MOLITE. See FULLERS' EARTH.

CI'MON, an Athenian commander, was the son of Miltiades, the conqueror at Marathon. In conjunction with Aristides, he was placed over the Athenian contingent to the allied fleet, which, under the supreme command of the Spartan Pausanias, continued the war against the Persians (477 B. C.). He effected the important conquest of Eion, a town on the river Strymon, then garrisoned by the Persians. Later (according to Clinton, 466 B. C.), when commander-in-chief, he encountered a Persian fleet of 350 ships at the river Eurymedon, destroyed or captured 200, and defeated the land-forces on the same day. He succeeded likewise in driving the Persians from Thrace, Caria, and Lycia; and expended much of the money which he had obtained by the recovery of his patrimony in Thrace upon the improvement of the city of Athens. At this period he appears to have been the most influential of the Athenians. The hereditary enemy of Persia, it was his policy to advocate a close alliance with Sparta; and when the Helots revolted, he led an army upon two occasions to the support of the Spartan troops; but on the latter occasion, having lost the confidence of his allies, he was ignominiously dismissed. After his return to Athens, his policy was opposed by the democracy, headed by Pericles, who procured his banishment by ostracism. He was recalled in the fifth year of his exile, and was instrumental in obtaining a five years' armistice between the Spartans and the Athenians. He died in the year 449 B. C., while besieging the Persian garrison of Citium, in Cyprus.

CINALO'A, a town of Mexico, in the state of the same name, on the Rio Cinaloa, about 50 miles from its entrance into the Gulf of California. It is a thriving place, with gold-washings in the vicinity. Pop. about 9000.

CINCHO'NA, a most important genus of trees, of the natural order *Cinchonaceæ*; yielding the bark so much valued in medicine, known as Peruvian Bark, Jesuit's Bark, China Bark, Quina, Quinquina, Cinchona Bark, &c., and from which the important alkaloids *Quinia* or *Quinine* (q. v.), and *Cinchonia* or *Cinchonine*, are obtained. The species of this genus are sometimes trees of great magnitude; but an aftergrowth springing from their roots when they have been felled, they often appear only as large shrubs; and some of them in the highest mountain-regions in which they are found, are low trees with stems only eight or ten feet in height. They exist only in South America, between s. lat. 20° and n. lat. 10°, and chiefly on the eastern slope of the second range of the Cordilleras. All the Cinchonas are evergreen-trees; with laurel-like, entire, opposite leaves; stipules which soon fall off; and panicles of flowers, which, in general appearance, are not unlike those of lilac or privet. The flowers are white, rose-colored, or purplish, and very fragrant. The calyx is small and 5-toothed; the corolla tubular with a salver-shaped 5-cleft limb. In the true *Cinchonas*, the capsule splits from the base upwards; the species in which it splits from above downwards form the sub-genus *Cascarilla*; the distinction acquiring importance from the consideration, that the barks of the former alone contain the alkaloids so valuable in medicine; and this property is further limited to those species which have the corolla downy or silky on the outside. Beyond the botanical limits thus narrowly marked out, not a trace of these alkaloids has yet been discovered anywhere.

Great difficulty has been found in determining the species by which the different varieties of C bark known in commerce are produced. The common commercial names are derived partly from the color of the kinds, and partly from the districts in which they are produced, or the ports where they are shipped. It appears, however, to be now ascertained that *Calisaya Bark*, also called Royal or Genuine Yellow Bark, one of the very best kinds—mostly shipped from Arica—is chiefly the produce of *C. Calisaya*, a large tree, growing in hot mountain valleys of Bolivia and the

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south of Peru. To give all the varieties of bark and species of tree would go beyond our limits.

The accurate discrimination of the different kinds of bark requires much experience. The taste is always bitter; but it is possible even to distinguish by the taste those varieties which contain quinia most largely from those in which cinchonia is most abundant.

The cutting and peeling of C.-trees are carried on by Indians, who go in parties, and pursue their occupation during the whole of the dry season. They build a hut, which serves both for their abode and for drying the bark. The trees are felled as near the root as possible, that none of the bark may be lost; and the bark being stripped off, is carefully dried; the quilled form of the thinner bark is acquired in drying. The bark is made up into packages of various size, but averaging about 150 lbs. weight, closely wrapped in woollen cloth, and afterwards in hides, to be conveyed on mules' backs to the towns. These packages are called drums or *serrons*. It is in them that the bark is always brought to Europe.

A number of spurious kinds of Peruvian or C. Bark are either sent into the market separately, or are employed for adulterating the genuine kinds. They are bitter barks, and have, in greater or less degree, febrifugal properties, but are chemically and medicinally very different from true C. bark. They are produced by trees of genera very closely allied to cinchona.

Whilst C.-trees have been becoming every year more scarce in their native regions, no attempt has been made to cultivate them there, notwithstanding the constantly increasing demand for the bark; but the Dutch have recently made extensive plantations of them in Java; and the same has been done in British India, from seeds and plants obtained from the South American governments, by Mr. Markham. In the course of his researches in South America, Mr. Markham found only one C.-tree planted by human hands. See PERUVIAN BARK.

The Indians of Peru call the C. trees *Kina*, from whence are derived the names *China*, *Quina*, &c. But it is not certain that they knew the use of the bark before the arrival of the Spaniards. It is a medicine of great value in the cure of intermittent fevers (see AGUE), and diseases attended with much febrile debility; also in certain forms of Neuralgia (q. v.), and other diseases of the nervous system. It seems to have been first imported into Europe in 1639 by the Countess Del Cinchon or Chinchon, the wife of the viceroy of Peru, who had been cured of an obstinate intermittent fever by means of it, and upon this account it was named *C. Bark* and *Countess's Powder* (*Pulvis comitissæ*). The Jesuit missionaries afterwards carried it to Rome and distributed it through their several stations, and thus it acquired the name of *Jesuits' Bark* and *Powder of the Fathers* (*Pulvis patrum*). Cardinal Juan de Lugo having been particularly active in recommending and distributing it, it was also known as *Cardinal de Lugo's Powder*. It attained great celebrity in Spain and Italy, being sold at high prices by the Jesuits, by whom it was lauded as an infallible remedy, while by most of the orthodox physicians it was coldly received, and by the Protestants altogether repudiated. Its mode of action not being well understood, and the cases to which it was applicable not well defined, it seems in the first instance to have been employed without due discrimination, and to have fallen very much into the hands of empirics. Falling, however, into disuse in Europe, it was again brought into notice by Sir Robert Talbor or Talbot, an Englishman, who brought it to England in 1671, and acquired great celebrity through the cure of intermittents by means of it, and from whom Louis XIV. purchased his secret in 1682. A pound of bark at that time cost 100 louis-d'or. Talbor seems to have been a vain and self-seeking man, but who had, nevertheless, the acuteness to discern and systematically to avail himself of the healing virtues of the neglected Jesuits' Bark, which he mixed with other substances, so as to conceal its taste and odor. Soon afterwards, both Morton and Sydenham, the most celebrated English physicians of the age, adopted the new remedy; and its use, from this period, gradually extended, both in England and France, notwithstanding the opposition of the Faculty of Medicine in the latter country. As it came into general use, it became a most important article of export from Peru; but for a long time, the value of the bark to be procured in New Granada remained unknown; and in order to the maintenance of a commercial monopoly, extraordinary methods were even employed to prevent it from becoming known at a comparatively recent period of Spanish rule

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in America. The discovery of the alkaloids on which its properties chiefly depend, constitutes a new era in the history of this medicine, and did not take place till the beginning of the present century.

The chief active principles are the two alkaloids, Quinine (q. v.) and Cinchonine. The latter is not generally present in so large a proportion as the quinine, and does not possess such powerful medicinal properties. When isolated, the alkaloid *Cinchonia*, or Cinchonine, has the formula ($C_{40}H_{24}N_2O_2$), and can be obtained in a crystallised state.

C. Bark itself has, in later times, fallen into comparative disuse, owing to the discovery of the alkaloid quinine, which is now extensively in use in medicine in the form of sulphate or disulphate of quinine, and is given in doses of from one to twenty grains, in almost all the cases to which the bark was supposed to be applicable.

CINCHONA'CEÆ, a natural order of exogenous plants, consisting of trees, shrubs, and herbaceous plants, with simple, entire, opposite, or whorled leaves, and stipules between their foot-stalks. The calyx is adherent to the ovary; the corolla is tubular and regular, its segments are equal in number to those of the calyx, when the calyx is divided; the stamens arise from the corolla, and are alternate with its segments. The ovary is surrounded by a disk, and usually two-celled; the style single, the fruit either splitting into two halves or not splitting at all, either dry or succulent.—This order has been very generally regarded by botanists as a sub-order of *Rubiaceæ* (q. v.), but far exceeds all the rest of that order, both in the number and importance of its species, of which from 2500 to 3000 are known, mostly tropical, and the remainder, with few exceptions, sub-tropical. The C. are nearly allied to *Caprifoliaceæ* (woodbines or honeysuckles, &c.), and interesting relations have been pointed out between them and *Umbelliferæ*. They constitute a very large part of the flora of tropical regions. Besides the genus *Cinchona* (q. v.) and other genera producing febrifugal barks—*Exostemma*, *Condamines*, *Pinckneya*, *Portlandia*, &c.—the order produces a number of valuable medicinal plants, of which Ipecacuanha (q. v.) is the most important. The Coffee (q. v.) shrub belongs to it; and also the tree which yields Gambir (q. v.). It produces a number of plants employed in dyeing, among which are the Clay Root or Choya, and some species of *Morinda*. Some trees of this order yield valuable timber. Many of the species have beautiful and fragrant flowers; and some produce pleasant fruits, among which are the Genipap (*Genipa Americana*) of South America, the Native Peach (*Sarcocephalus esculentus*) of Sierra Leone, and the Voavanga of Madagascar (*Vanqueria edulis*).

CINCINNA'TI, the commercial capital of Ohio, is situated on the right bank of the river which gives name to the state, and separates it from Virginia and Kentucky. It stands in lat. 39° 6′ 30″ n., and in long. 84° 26′ w., 458 miles below Pittsburg, in Pennsylvania, where the Ohio, as such, is first formed, and 500 miles above the junction of that stream and the Mississippi. Though C. was founded in 1788, yet, in 1800, it had only 750 inhabitants. In the years 1820, 1830, 1840, 1850, and 1860 respectively, the census returns shewed a population of 9602, 24,880, 46,338, 115,438, and 161,004. In 1860, it had increased to 255,139, including a large proportion of Germans and Irish. The natural facilities of C. for commerce are great, and they have been increased artificially by the Miami Canal, which unites it with Lake Erie. Railways branch off from C. as a centre in several directions, and the river Ohio gives facility for the carrying on of a large portion of the commerce. In the ten years ending 1875, the exports averaged 201,236,066 dollars, and the imports 314,528,609 dollars; being together equivalent to about £110,000,000.

The staple article of the trade of C. is pork. In 1874—5, 560,164 hogs were slaughtered. Wine from the Catawba (q. v.) grape is made in the neighborhood to a great extent. The city itself also is largely engaged in a variety of important manufactures, hundreds of steam-engines being employed in the different establishments, and the aggregate product having, in 1874, been computed at 144,207,871 dollars. The manufactories include iron-foundries, rolling mills, lard, oil, and stearine factories, and countless works connected with flour, clothing, furniture, paper, printing, tobacco, soap, candles, hats, &c. In 1874, iron was produced to the value of 17,000,000 dollars; food, 24,000,000 dollars; clothing, 18,280,000 dollars; and

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liquors, 24,000,000 dollars. There are about 75 newspapers and periodicals, including 9 daily, of which 8 are in German.

C. is substantially and handsomely built. Its ecclesiastical, literary, and commercial edifices are as numerous as befits the acknowledged Queen of the West. The city occupies chiefly two terraces, which are elevated respectively 50 feet and 108 above the level of the river. For the supply of the inhabitants, the water of the Ohio has been lifted up into an immense reservoir, at an expense of about £160,000. A large suspension bridge, 100 feet above low water, connects the city with Covington in Kentucky. There is also a railway pier-bridge. Education flourishes, and there are numerous free schools.

CINCINNA'TI (the Cincinnatuses), a society or order in the United States of North America, established by the officers of the revolutionary army in 1783, "to perpetuate their friendship, and to raise a fund for relieving the widows and orphans of those who had fallen during the war." It was so named because it included patriots, headed by Washington, who in many instances had left rural affairs to serve their country (see CINCINNATUS). The badge of the society is a bald eagle suspended by a dark-blue ribbon with white borders, symbolising the union of France and America. On the breast of the eagle there is a figure of Cincinnatus receiving the military ensigns from the senators, with the plough in the background; round the whole are the words, *Omnia reliquit servare rempublicam*. On the reverse, the same hero is represented crowned by Fame with a wreath on which is inscribed *virtutis præmium*, &c. As this distinction was made hereditary, it was attacked, as opposed to republican equality. Franklin saw in it the germ of a future aristocracy, and at a meeting held in Philadelphia in 1784, several changes were made in the constitution of the society, and in several of the states it was quietly abolished. There are still, however, several state societies, which hold a general meeting by delegates triennially.

CINCINNA'TUS, Lucius Quinctius, a Roman consul, regarded by the later Romans as the model of antique virtue and simple manners. So far as we can discern his character through the veil of legend, C. appears to have been a violent patrician. About 460 B.C., he was chosen consul, and two years later was made dictator. When the messengers from Rome came to tell C. of his new dignity, they found him ploughing on his small farm. He soon rescued the consul Lucius Minucius, who had been defeated and surrounded by the Æqui. Livy's account of the mode in which the deliverance was effected is rejected by Niebuhr, who points out the inconsistencies and impossibilities of the story, and seems disposed to regard the whole as a mere myth. We are next informed that, after a dictatorship of sixteen days, C. returned to his small farm on the Tiber. When 80 years old, he was once more made dictator (439 B.C.), and suppressed a threatened plebeian insurrection.

CI'NDER-BED, a name given by the quarrymen to a stratum of the Upper Purbeck series, almost entirely composed of the loosely aggregated shells of a small oyster (*Ostrea distorta*).

CINERA'RIA, a genus of plants of the natural order *Compositæ*, sub-order *Corymbiferæ*, very nearly allied to *Senecio* (Groundsel, Ragwort, &c.), from which it differs only in having the involucre formed of one row of equal erect scales. The species are numerous, and widely diffused over the world in very various climates. They are annual or perennial herbaceous plants; with simple, generally toothed or sinnate leaves. Many of them are remarkable for the ashy appearance of the lower part of the leaves, whence their name (Lat. *cinis, -eris*, ashes). The leaves are often covered with a peculiar sort of down. Two small species are natives of the southern parts of Britain. The flowers of some are very pretty. *C. maritima*, a native of the south of Europe, and other species, have for some time been much cultivated in gardens and green-houses. Many hybrids and varieties have been produced by cultivation.

CI'NERARY URNS (Lat. *cinis*, ashes) were used by the nations of antiquity to contain the ashes of the dead when gathered from the funeral pile. Previous to being deposited in the urn, the embers were soaked with wine; the urn was then placed in a niche in the family mausoleum. Only the wealthy could afford so expensive a rite. C. U. were either sculptured in marble, or formed of clay or glass.

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They were not always in the form in which we commonly see them represented on modern tombs. A celebrated cinerary urn known by the name of the Portland or Barberini vase, is preserved in the British Museum. This beautiful production of Greek art was discovered about the middle of the 16th c., in a marble sarcophagus in a sepulchre (believed to be that of the Roman emperor Alexander Severus, 223—235 A.D.) at Monte del Grano, near Rome. The height of the urn is 10 inches. One of the finest specimens yet discovered in the British Isles is preserved in the museum of the Royal Irish Academy. It was found in a small stone chamber near Bagnalstown, county of Carlow. It is composed of very fine clay, and is but 2¼ inches high. It contained the burnt bones of an infant or very young child.

CINI'SI, a town of Sicily, in the province of Palermo, 14 miles west-north-west of Palermo, near the coast. It is a neat, cheerful town, with straight, regular streets, and has 6714 inhabitants. The Benedictine convent here was once a feudal castle.

CI'NNA, Lucius Cornelius, a Roman noble, was one of the principal supporters of the faction of Marius. After Sulla had driven Marius from the city, and before setting out on his expedition against Mithridates, he allowed C. to be elected to the consulship. But C. had no sooner entered upon that office (87 B.C), than he impeached Sulla, endeavored to form an interest among the citizens who had been added to Rome after the Social War, and agitated for the recall of Marius. The events which led to the return of Marius are stated in the article Marius (q. v.). After a cruel massacre of the Roman citizens, in which some of the most eminent statesmen and orators were slain, Marius and C. declared themselves consuls. On the death of Marius, which occurred within a few days of his usurpation, C. made L. V. Flaccus his colleague for that year, and C. P. Carbo for the two succeeding years. In 84 B.C., he prepared to meet Sulla, who was then on his way from the East to take vengeance upon his enemies, but was slain by his disaffected troops at Brundusium. During his fourth consulate his daughter Cornelia had been married to Julius Cæsar.

CI'NNABAR, an ore of mercury, from which almost all the mercury of commerce is obtained. Chemically, it is a bisulphuret of mercury, containing 86.2 parts of mercury and 13.8 of sulphur. It occurs both crystalised and massive, not unfrequently disseminated. Its crystals are six-sided prisms. It varies from perfectly opaque to almost transparent; has an adamantine almost metallic lustre, and a carmine color, with a bright scarlet streak. Its specific gravity is 8—8.2. *Hepatic C.*, so called from its liver-brown color, is a variety containing a little carbon. C. sometimes occurs in primitive rocks, but more frequently in those of the coal formation, and is sometimes even intimately mixed with coal itself. It is, however, a rare mineral, and is nowhere found in Britain. The C. mines of Almaden, in Spain, have been worked for about 2300 years, and are still the most productive in the world. At Almaden, the C. is found in a dark-colored slate mixed with quartzite. Next to the mines of Almaden, rank those of Idria in Carniola. C. mines exist also in Germany, Hungary, Peru, California, China, Japan, &c. C. is used as a pigment under the name of *Vermilion*.

CINNA'MIC ACID and the Cinnamyl Series. Cinnamyl is a compound radical, as yet unisolated, which is represented by the formula $C_{18}H_7O_2$, and which includes amongst its compounds cinnamic acid ($C_{18}H_7O_2$,HO), oil of cinnamon, which is chemically a slightly impure aldehyde of cinnamic acid, or a hydride of cinnamyl ($C_{18}H_7O_2$.H) chloride of cinnamyl ($C_{18}H_7O_2$.Cl), styrone or pernvine, known chemically as cinnamic alcohol ($C_{18}H_{10}O_2$), cinnamol and styrol, each represented by the formula $C_{18}H_8$, and styracin ($C_{18}H_{16}O_4$). We shall briefly notice the most important of these compounds—viz., cinnamic acid and oil of cinnamon. *Cinnamic Acid* ($C_{18}H_8O_4$) crystallises in colorless prisms, which are sparingly soluble in cold water, but dissolve readily in boiling water, alcohol, and ether. It fuses at 266°, and boils with or without decomposition, according to the manner in which it is heated, at about 570°. It is converted by most decomposing agents into benzoyl compounds, such as benzoic acid, oil of bitter almonds, &c.; for example, when fused with hydrate of potash, it assimilates the elements of water, and breaks up into acetic and benzoic acids; when boiled with peroxide of lead, it is converted into oil of bitter almonds and benzoic acid, &c. It exists naturally in a free state in

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liquid storax, the balsams of Tolu and Peru, and gum benzoin, and is often deposited in large crystals from old samples of oil of cinnamon and from cinnamon water. It is always formed from oil of cinnamon when the latter is exposed to the action of the air, and it has been synthetically or artificially formed by exposing equivalent quantities of chloracetyl ($C_4H_3O_2Cl$) and oil of bitter almonds($C_{14}H_6O_2$) to a prolonged heat in a closed glass tube. *Oil of Cinnamon* and *Oil of Cassia*, although prepared from different kinds of trees, are virtually identical in their composition, each consisting mainly of cinnamic aldehyde, or hydride of cinnamyl, mixed with certain resinous matters. Oil of cinnamon is an article of the materia medica, and in doses of one minim to a five-grain pill, forms an excellent aromatic addition to cathartic pill-masses.

CINNAMON is the spicy, aromatic, and stimulating bark of a certain species of the genus *Cinnamomum*. This genus belongs to the natural order *Lauraceæ*, and was formerly included in *Laurus*. It contains a considerable number of species, natives of tropical and subtropical parts of the East. C. has been in use from the remotest antiquity. It is mentioned in the Old Testament, and by a name almost the same as that which it still bears in most languages. The finest kind is said to be chiefly produced by *Cinnamomum Zeylanicum* (formerly *Laurus Cinnamomum*), which chiefly grows in the island of Ceylon, although, having been introduced into the West Indies in 1782, along with various other plants of the East, it is now cultivated there to some extent. The tree attains the height of 20—30 feet, and is sometimes 1½ foot in thickness. Its bark is of a grayish-brown color, internally of a yellowish red. The leaves are oval, 4—6 inches long, with a blunt point, and marked with three principal nerves. They have the taste of cloves. The flowers are of a silky gray on the outside, and a pale-yellowish color internally. The fruit is somewhat like an acorn in shape; it is a small drupe, brown when ripe. There are two seasons of cinnamon-harvest in Ceylon, the first commencing in April and the last in November—the former being that in which the chief crop is obtained. The branches of 3—5 years' growth being cut down, the epidermis is scraped away; the bark is then ripped up longitudinally with a knife, and gradually loosened, till it can be taken off. The slices are then exposed to the sun, when as it dries, it curls up into *quills*, the smaller of which are inserted into the larger and the whole tied up in bundles of about 88 lbs. each. C. is examined and arranged according to its quality by persons who are obliged for this purpose to taste and chew it, although in a short time it produces painful effects on their mouths and tongues. The finest C. is yielded by the young branches of the tree, especially by the numerous shoots which spring up from the stump after a tree has been cut down, and which are cut when about 10 feet long, and of the thickness of an ordinary walking-stick. The smell, particularly of the thinnest pieces, is delightfully fragrant, and the taste pungent and aromatic, with a mixture of sweetness and astringency. It is used like other spices by cooks and confectioners, and also in medicine as a tonic, stomachic, and carminative. The average quantity annually imported into London is about 500,000 lbs. Its virtues depend chiefly upon the essential oil which it contains (*Oil of Cinnamon*). Oil of cassia is very often substituted for this oil, as cassia—which, however, may readily be distinguished by its mucilaginous taste—is for cinnamon. The root of the C.-tree contains camphor. The fruit yields a concrete oil, called *Cinnamon Suet*, which is highly fragrant, and in Ceylon was formerly made into candles, for the exclusive use of the king.—CASSIA (q. v.) is the produce of another species of *Cinnamomum*. —*C., Loureiri*, a native of Cochin China and Japan, is said to yield a bark even superior to that of *C. Zeylanicum*. A species of C., which ascends to the elevation of 8500 feet in the Sikkim Himalaya, deserves a trial even in the climate of Britain.

The constituents of C. are a volatile oil (*Oil of C.*), tannin, starch, mucilage, woody-fibre, resin, coloring matter, and an acid. The oil of C. is generally prepared in Ceylon by grinding the coarsest pieces of C., soaking them in sea-water for two or three days, and then distilling. Two oils pass over, one lighter, the other heavier than water. Oil of C. varies in color from yellow to cherry-red, the yellow variety being considered the best, and is most highly esteemed. *Oil of C. leaf* is prepared from the leaves in Ceylon by a similar process, and is met with in commerce under the name of *clove oil*, which it much resembles in odor. *C. water* is obtained by adding water to C., and distilling a large quantity, or by diffusing the *oil of C.*

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through water by the aid of sugar or carbonate of magnesia. *Spirit of C.* is procured by acting upon C. with spirit of wine and water, and distilling; and *tincture of C.*, by soaking C. in spirit of wine, and straining. The medicinal properties of C, and its preparation, are aromatic and carminative, and it is serviceable in cases of nausea and vomiting, and in cases of flatulence and spasmodic states of the stomach and alimentary canal.

CINNAMON-STONE, a precious stone, of which the finer specimens are highly esteemed; it is regarded as a variety of Garnet (q. v.). Its color varies from hyacinth red to orange yellow; and when pure, it is transparent. It is composed essentially of silica, alumina, and lime. It is found chiefly in Ceylon, where vast boulders of gneiss containing it in profusion exist in many places.

CINNYRIS. See SUN-BIRDS.

CINQUE CENTO (Ital.), five hundred. A technical, or rather *slang* artistic term used to designate the style of art which arose in Italy after the year 1500, and which therefore belongs to the 16th c.; i. e., after the fall of all the great schools. It is sensuous in its character, the subjects chosen being usually borrowed from heathen mythology or history.

CINQUEFOIL, in Botany. See POTENTILLA.

CINQUEFOIL, a common bearing in heraldry. It is usually depicted with the leaves issuing from a ball as a centre point.—C., in architecture, is an ornamental foliation in five compartments, used in the tracery of windows, panellings, and the like. The C. is often represented in a circular form, the spaces between points or cusps representing the five leaves.

The C. of heraldry and of architecture is not derived from any leaf of five leaflets, but, as its perfect regularity of form indicates, from the flower of the plant called C. (*Potentilla*), or other similar flower of five petals or *leaves*. The C. thus closely resembles the rose, with which it would, indeed, be identified, but that a double and not a single rose is chosen for the purpose of heraldry and decorative art.

CINQUE PORTS (Fr. five ports). It is said that the five maritime ports of England lying opposite to the coast of France—Sandwich, Dover, Hythe, Romney, and Hastings—were enfranchised in the time of Edward the Confessor. But it was subsequent to the battle of Hastings that the Conqueror, in order that he might wield the resources of the seaports with greater vigor, constituted this whole line of coast into a jurisdiction entirely separate from the counties of Kent and Sussex, and erected it into a sort of county palatine, under a warden or guardian, the seat of whose administration was in Dover Castle. The warden, whose office corresponded to that of the ancient count of the Saxon coast (*Comes littoris Saxonici*), exercised jurisdiction, civil, military, and naval, uniting in his single person the functions of sheriff, custos rotulorum, lord-lieutenant, and admiral. Privileges equal to those originally bestowed on the C. P. were subsequently extended to the so-called *ancient towns* of Winchelsea and Rye; and most of the municipal towns had subordinate ports and towns attached to them, which were called *members*. In place of the Saxon terms of *aldermen* and *freemen*, those of *jurats* and *barons* were introduced, and the latter term has always been applied to the representatives of the C. P. in parliament. The chief function performed by the C. P. in early times consisted in furnishing such shipping as was required for the purposes of the state, the crown having possessed no permanent navy previous to the reign of Henry VII. In the time of Edward I. they were bound to provide no less than 57 ships, fully equipped and manned at their own cost; though the weight of this heavy burden was somewhat lessened by the provision, that the period of gratuitous service should be limited to 15 days. In consequence of the warlike navy which they were thus compelled to maintain, the C. P. became so confident in their strength, and so insolent and audacious as not only to undertake piratical expeditions, but even to make war and form confederacies as independent states. Previous to the Revolution of 1688, the lord-wardens were in use to nominate the barons, or parliamentary representatives of the C. P.; but in 1689, an act was passed to "declare the right and freedom of election of members to serve in parliament for the cinque ports." The Reform Bill of 1882 reduced the number of members sent to parliament by the C. P. from 16 to 8, and the Municipal

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Reform Act has broken up the ancient organisation of the ports, and assimilated their internal arrangements to those of other English municipalities. The ancient courts of Stepney, Brotherhood, and Guestling are still occasionally held, but their powers scarcely extend beyond matters of form, such as appointing the barons, who are to exercise an ancient privilege of the ports, which consists in carrying the canopy over the sovereign's head at a coronation. The lord-warden's jurisdiction, in relation to civil suits and proceedings, was abolished by 18 and 19 Vict. c. 48, amended by 20 and 21 Vict. c. 1.

CI'NTRA, a small but picturesquely situated town in Portugal, in the province of Estremadura, about 15 miles west-north-west of Lisbon, with a population of 4000. It stands on the declivity of the Sierra de Cintra, and is surrounded by country residences. There is a palace at C., a strange mixture of Moorish and Christian architecture, anciently occupied by the Moorish kings, and subsequently a favorite residence of the Christian monarchs. A charming view of the town and of the sea is to be had from the top of a hill crowned with the ruins of a Moorish castle. On another hill-top stands La Penna, once a convent, now a residence of the king of Portugal, who has restored and given it the outward appearance of a feudal castle. In the neighborhood, also, is what is called the Cork Convent, which derives its name from the cells—which are cut out in the rock—being lined with cork to prevent damp.

C. is historically remarkable for the *Convention* concluded here, August 22, 1808, between the English and French, by which the latter agreed to evacuate Portugal. Junot had been defeated by Sir Arthur Wellesley at Vimieira, and had retreated towards Torres Vedras and Lisbon, whither the English under Sir Hew Dalrymple, who had just arrived and assumed the chief command, were preparing to follow them. But the French, despairing of finally holding out, agreed to evacuate the country, on condition of not being treated as prisoners of war, but landed on the coast of France, retaining their arms and effects. This convention excited the greatest public indignation both in the Peninsula and in England. Several English newspapers appeared in mourning, and the ministry were obliged to have the generals who signed the convention tried by a court-martial, which, however, resulted in their acquittal. In fact, though the terms of the convention might be advantageous for the French, to obtain immediate possession of Portugal and Lisbon, instead of being put to the necessity of a bloody siege for months, was no less advantageous to the English and their allies. Such, at least, was the opinion of two competent judges—Napoleon and Wellington.

CIOTAT, La, a town of France in the department of Bouches-du-Rhone, situated on the west side of a bay in the Mediterranean, about 15 miles south-east of Marseille, in the midst of a district clad with olive, orange and pomegranate plantations. It is well built, and has a good and commodious harbor, formed by a mole, and well defended. The industry consists in cotton spinning, ship building, and an active trade in the produce of the district. Pop. (1872) 8232.

CI'PHER, an ornamental arrangement of the initial letters of a name, by which they become also a private mark, adopted by artists and architects as distinctive of their work. That of Albrecht Dürer is well known.

CI'PHER-WRITING. See CRYPTOGRAPHY.

CIPRIA'NI, Giambattista, a painter and copper engraver, was born in Florence 1732, or according to others, in 1727, and when 19 years old, went to Rome, where he chose Correggio as a model and soon gained a high reputation. Invited by certain English residents in Rome, the artist came to London about 1754, where he was one of the first members of the Royal Academy (founded 1769), and died in 1785. His drawing is correct, his coloring harmonious, his heads have grace and loveliness, and the general style of his works is attractive, although exceedingly conventional. A series of small copperplate illustrations of "Orlando Furioso" well exemplifies his graceful style. Several of Bartolozzi's best engravings are in C.'s manner.

CIRCÆ'A (from *Circe*, (q. v.), a genus of rather pretty little herbaceous plants of the natural order *Onagraceæ*, with a deeply 2-cleft calyx, a corolla of two petals, and two stamens. *C. Lutetiana* is frequent in shady situations in Britain, and in most parts of the continent of Europe. It bears the English name of ENCHANTER'S

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NIGHTSHADE, and in Germany it is called Hexenkraut (Witches' Herb). The origin of such names is [illegible] easily explained. The plant possesses no remarkable properties, being merely a little astringent. Other species are found in the Himalaya, &c.

CIRCASSIA, a division of the Western Caucasus, comprising the north, and also a portion of the south slope of that mountain-range extending in latitude 43°—45° n., and longitude 37°—47° e. See CAUCASUS.

CIRCASSIANS, in the wide sense of the term, is the name given to all the independent tribes of the Caucasus; in a narrower sense, it denotes the tribes who inhabited the western part of the range which is called, in consequence, Circassia. The C. proper, however, occupied only the north-western wing of the Caucasus, with the exclusion of Abasia, or the portion between the Black Sea in the west, and the lower bank of the river Kuban in the north. They call themselves Adighé, but the Russians and Turks call them *Tcherkesses*. On their conquest by Russia in 1864, rather than remain in subjection to that power they chose to emigrate to Turkey, and from 400,000 to 50,000, or nearly the whole nation of fifteen tribes, carried this resolution into effect. The greater part of them were distributed over the Turkish possessions in Asia Minor, but others were settled in the mountainous parts of Bulgaria and on the borders of Servia. In their original country they were a marauding and warlike people, amongst whom it was held more honorable to live by plunder than by peaceful industry. In common with all brigand tribes, the C. cherished the most unrestrained love of independence. Their government was a singular compound of constitutionalism and feudalism. There were five distinct ranks in the nation—viz., chiefs or princes, nobles, common freemen, dependants, and slaves. The class of common freemen made up the great mass of the people; they possessed property, and enjoyed the same political rights as the nobles. The fourth class, the dependants, were the vassals of the princes and nobles, whose lands they cultivated, and whose armies they formed. Yet their lord had no right over their persons; for in some cases they and their whole families left him; and they could only be sold as slaves for punishment according to the previous verdict of a national assembly. The fifth class comprised the slaves, or those who had been made captive in war. That the C. have not lost some of the worst traits of their natural character since their settlement in Turkey is shewn by their participation in the Bulgarian massacres of 1876 and 1877.

The C. princes and nobles are principally Mohammedans, whilst the great mass of the people have a religion which is a kind of mixture of Christianity and paganism, in which the celebration of Easter, the sign of the Cross, sacred trees, sacrifice, and processions with lights, play an important part. Besides agriculture and the rearing of cattle, they possess a few other branches of industry. The C. are proverbially handsome; they are also strong, active and temperate, and are characterised by the higher attributes of self-dependence, courage, and prudence. As a nation they made their first historical appearance during the middle ages. They are, however, chiefly known through their long struggles to maintain their independence against the aggression of Russia. See CAUCASUS. For their place in ethnology, see CAUCASIAN VARIETY OF MANKIND.

CI'RCÉ, a fabulous sorceress, is described by Homer as "fair-haired, a clever goddess, possessing human speech," sister of "all-wise Æætes," daughter of "the Sun, who gives light to mortals, and of Perse, whom Ocean begot as his daughter." Round her palace in Æea were numbers of human beings, whom she had changed into the shapes of wolves and lions by her drugs and incantations. She changed two-and-twenty of the companions of Ulysses into swine; but that hero, having obtained from Mercury the herb *Moly*, went boldly to the palace of the sorceress, remained uninjured by her drugs, and induced her to disenchant his comrades. He remained with her for a year; and when he departed, she instructed him how to avoid the dangers which he would encounter on his homeward voyage ("Odyssey," Books x. and xii.). Jealous of Scylla, whose love was sought by Glaucus, she poured the juice of poisonous herbs into that part of the sea where her rival was accustomed to bathe, and changed her into a hideous monster ("Metamorphoses," Book xiv., fables 1 and 6).

CI'RCLE, a plane figure bounded by a curved line, which returns into itself, called

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its *circumference*, and which is everywhere equally distant from a point within it called the *centre* of the circle. The circumference is sometimes itself called the C., but this is improper; C. is truly the name given to the space contained within the circumference. Any line drawn through the centre, and terminated by the circumference, is a *diameter*. It is obvious that every diameter is bisected in the centre. (See ARC, CHORD.) In Co-ordinate Geometry, the C. ranks as a curve of the second order, and belongs to the class of the conic sections. It is got from the right cone by cutting the cone by a plane perpendicular to its axis. The C. may be described mechanically with a pair of compasses, fixing one foot in the centre, and turning the other round to trace out the circumference. The C. and straight line are the two elements of plane geometry, and those constructions only are regarded as being properly geometrical which can be effected by their means. As an element in plane geometry, its properties are well known and investigated in all the text-books. Only a few of the leading properties will here be stated.

1. Of all plane figures, the C. has the greatest area within the same perimeter.

2. The circumference of a C. bears a certain constant ratio to its diameter. This constant ratio, which mathematicians usually denote by the Greek letter π, has been determined to be 3·14159, nearly, so that, if the diameter of a C. is 1 foot, its circumference is 3·14159 feet; if the diameter is 5 feet, the circumference is $5 \times 3{\cdot}14159$; and, in general, if the diameter is expressed by $2r$ (twice the radius), then c (circumference) $= 2r \times \pi$. Archimedes, in his book "De Dimensione Circuli," first gave a near value to the ratio between the circumference and the diameter, being that of 7 to 22. Various closer approximations in large numbers were afterwards made, as, for instance, the ratio of 1815 to 5702. Vieta, in 1579, shewed that if the diameter of a C. be 1000, &c., then the circumference will be greater than 3141·5926535, and less than 3141·5926537. This approximation he made through ascertaining the perimeters of the inscribed and circumscribed polygons of 393,216 sides. By increasing the number of the sides of the polygons, their perimeters are brought more and more nearly into coincidence with the circumference of the circle. The approximation to the value of π has since been carried (by M. de Lagny) to 128 places of figures. It is now settled that π belongs to the class of quantities called *Incommensurables* (q. v.), i. e., it cannot be expressed by the ratio of any two whole numbers, however great. In general, it may be considered that 3·14159 is a sufficiently accurate value of π.

Though the value of π was at first approached by actually calculating the perimeter of a polygon of a great number of sides, this operose method was long ago superseded by modes of calculation of a more refined character, which, however, cannot here be explained. Suffice it to say that various series were formed expressing its value; by taking more and more of the terms of which into account, a closer and closer approach to the value might be obtained. We subjoin one or two of the more curious.

$$\pi = 4\left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \&c.\right)$$

$$\pi = 8\left(\frac{1}{1\cdot3} + \frac{1}{3\cdot5} - \frac{1}{3\cdot5\cdot7} + \frac{1}{5\cdot7.9} - \frac{1}{7\cdot9\cdot11} + \frac{1}{9\cdot11\cdot13} - \&c.\right)$$

3. The area of a C. is equal to π multiplied by the square of the radius ($= \pi r^2$); or to the square of the diameter multiplied by $\frac{\pi}{4}$; i. e., by ·7854. Euclid has proved this by shewing that the area is equal to that of a triangle whose base is the circumference, and perpendicular height the radius of the circle.

4. It follows that different circles are to one another as the squares of their radii or diameters, and that their circumferences are as the radii or diameters.

The C. is almost always employed to measure angles, from its obvious convenience for the purpose, which depends upon the fact demonstrated in Euclid (Book iv. Prop. 33), that angles at the centre of a C. are proportional to the arcs on which they stand. It follows from this, that if circles of the same radii be described from

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the vertices of angles as centres, the arcs intercepted between the lines, including the angles, are always proportional to the angles. The C. thus presents us with the means of comparing angles. It is first necessary, however, to graduate the C. itself; for this purpose, its circumference is divided into four equal parts, called *quadrants*, each of which obviously subtends a right angle at the centre, and then each quadrant is divided into degrees, and each degree into minutes, and so on. The systems of graduation adopted are various, and will now be explained.

The sexagesimal scale is that in common use. According to it, each quadrant or right angle being divided into 90 *degrees*, each degree is divided into 60 seconds, and each second into 60 thirds, and so on. According to this scale, 90° represents a right angle; 180°, two right angles, or a semicircle; and 360°, four right angles, or the whole circumference—the unit in the scale being the $\frac{1}{360}$th of a right angle. As the divisions of the angles at the centre, effected by drawing lines from the centre to the different points of graduation of the circumference, are obviously independent of the magnitude of the radius, and therefore of the circumference, these divisions of the circumference of the C. may be spoken of as being actually divisions of angles. By laying a graduated C. over an angle, and noticing the number of degrees, &c., lying on the circumference between the lines including the angle, we at once know the magnitude of the angle. Suppose the lines to include between them 3 degrees, 45 minutes, 17 seconds, the angle in this scale would be written 3° 45′ 17″.

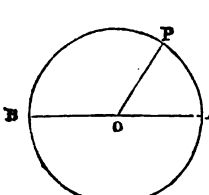
It is obvious, however, that the division of the quadrant into 90 degrees instead of any other number, is quite arbitrary. We may measure angles by the C., however we graduate it. Many French writers, accordingly, have adopted the

Centesimal Division of the Circle.—In this division, the right angle is divided into 100 degrees, while each degree is divided into one hundred parts, and so on. This is a most convenient division, as it requires no new notation to denote the different parts. Such a quantity as 8° 45′ 17″ is expressed in this notation by 8·4517, the only mark required being the decimal point to separate the degrees from the parts. Of course, in this illustration, 3° means 3 centesimal divisions of the right angle, and 45′ means 45 centesimal minutes, and so on. If we want to translate the quantity 8° of the common notation into the centesimal notation, we must multiply 8 by 100, and divide by 90. To translate minutes in the common notation into the centesimal, the rule is to multiply by 100, and divide by 54.

There remains yet another mode of measuring angles, known as the

Circular Measure.—The circular measure of angles is in frequent use, and depends directly on the proposition (Euc. vi. 33), that angles at the centre of a C. are proportional to the arcs on which they stand. Let POA be an angle at the centre O of a C., the radius of which is r; APB a semicircle whose circumference accordingly $= \pi r$; and let the length of the arc AP $= a$. Then, by Euclid, $\frac{\text{angle POA}}{\text{2 right angles}} = \frac{a}{\pi r}$;

and $\angle \text{POA} = \frac{\text{2 right } \angle \text{s}}{\pi} \cdot \frac{a}{r}$. Now, supposing a and r to be given, although the angle POA will be determined, yet its numerical value will not be settled unless we make some convention as to what angle we shall call unity. We are free to make any convention we please, and therefore choose such a one as will render the preceding equation the most simple. It is made most simple if we take $\frac{\text{2 right angles}}{\pi} = 1$. We shall then have (denoting the numerical value of the angle POA by θ) $\theta = \frac{a}{r}$.



The result of our convention is, that the numerical value of two right angles is π, instead of 180°, as in the method of angular measurement first alluded to; and the

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unit of angle, instead of being the ninetieth part of a right angle is 2 right angles / π, or 57° 17′ 44″ 48‴ nearly. Making $\theta = 1$ in the equation $\theta = \frac{a}{r}$, we have a (or AP) $= r$ (or AO), which shews that in the circular measure, the unit of angle is that angle which is subtended by an arc of length equal to radius. It is frequently a matter of indifference which mode of measuring angles is adopted; the circular measure, however, is generally the most advantageous, as being the briefest. It is easy to pass from this mode of measurement to the sexagesimal. If θ be the circular measure of an angle, the angle contains $\frac{\theta}{\pi}$. 180 degrees; conversely, if an angle contain $n°$, its circular measure is $\frac{n}{180}.\pi$.

CIRCLE, Magic, a space in which sorcerers were wont, according to the ancient popular belief, to protect themselves from the fury of the evil spirits they had raised. This C. was usually formed on a piece of ground about nine feet square (in the East seven feet appears to have been considered sufficient), in the midst of some dark forest, churchyard, vault, or other lonely and dismal spot. The C. was described at midnight in certain conditions of the moon and weather. Inside the outer C. was another somewhat less, in the centre of which the sorcerer had his seat. The spaces between the circles, as well as between the parallel lines which enclosed the larger one, were filled "with all the holy names of God," and a variety of other characters supposed to be potent against the powers of evil. Without the protection of this C., the magician, it was believed, would have been carried off by the spirits, as he would have been, had he by chance got out of the charmed space.

CIRCLE, Mural, an instrument used for determining the meridian altitude or zenith distance of a star. It consists of an astronomical telescope firmly fixed to a graduated circle, which moves about a horizontal axis, fixed in a strong vertical wall running north and south. In the common focus of the eye-piece and object-glass of the telescope is a system of cross-wires (spider lines are generally used for the purpose), one being horizontal, and five vertical, with equal spaces between. The line joining the optical centre of the object-glass with the intersection of the horizontal and middle vertical wires, is called the line of *collimation* of the telescope, and when the instrument is in perfect adjustment, this line moves in the plane of the meridian.

Besides the above-mentioned fixed wire, there is a movable one, called a micrometer wire, which is moved by means of a screw, remaining always parallel to the fixed horizontal wire.

If the instrument be so adjusted that the image of a star, while passing across the middle vertical wire in the field of view, shall at the same time be bisected by the fixed horizontal wire, the star is at that moment in the line of collimation of the telescope. It is therefore at that moment in the meridian, and its meridian zenith distance is the angle through which the circle would have been turned from the position it had when the line of collimation of the telescope pointed to the zenith. There is a fixed pointer, for the purpose of approximately reading the instrument. If the instrument were accurately adjusted, so that this pointer was opposite the zero point of the circle, when the line of collimation of the telescope pointed to the zenith, the arc, in the position of the instrument, would be the meridian zenith distance of the star.

Great nicety is required in "reading" the instrument; i. e., in determining exactly the arc through which the circle has moved in bringing the telescope from the vertical to any other position. The rim is usually graduated at intervals of five minutes; and the eye could determine only the division nearest to the fixed index. But by means of a "reading microscope," or Micrometer (q. v.), fixed opposite to the rim, the portion of the interval to the nearest division on the rim can be read to seconds. There are usually six such microscopes fixed opposite different points of

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the rim; and the "reading" of the instrument is the mean of the "readings" of all the microscopes. This tends to eliminate errors arising from imperfect graduation and adjustment.

It is evident that the difference between any two readings of the instrument will represent the angle through which the line of collimation of the telescope moves in passing from one position to the other. It remains to shew how a fixed point—viz., the Nadir (q.v.), is observed, and then how an observation is taken of the star itself in its meridian passage.

We must explain here that the fixed horizontal wire in the eye-piece of the telescope, in the instruments as now used, is only an *imaginary* line which determines the line of collimation of the telescope. It coincides with the position of the micrometer wire, when the screw-head of the micrometer marks zero.

To observe the nadir, a trough of mercury is placed underneath the instrument, and the telescope is turned so as to look vertically downwards into it. An image of the system of cross-wires which is in the common focus of the object-glass and eye-piece, will be reflected back again to nearly the same focus. Looking into the telescope, the observer now adjusts it by means of a tangent screw till the reflected image of the horizontal wire coincides with the real one. The final adjustment is perhaps most delicately effected by turning the screw-head of the micrometer which moves the wire itself. When they coincide, the line joining the centre of the object-glass of the telescope with the intersection between the middle vertical and horizontal micrometric wire, will be vertical. Now, the angle between this and the line of collimation of the telescope, which, as we have said, joins the optical centre of the object-glass with the intersection of the middle vertical and imaginary fixed horizontal wire, will, if the micrometer is in proper adjustment, be at once read off the micrometer screw-head. The instrument being clamped as above adjusted, the microscopes are read off, and the reading of the micrometer screw-head above mentioned being added to or subtracted from this reading, as the case may be, the nadir reading of the instrument is determined. The zenith reading, therefore, which differs from it by 180°, is at once known.

Again, to observe a star in the meridian, the instrument is previously adjusted so that the star, in passing the meridian, shall pass over the field of view of the telescope. As the image of the star approaches the centre of the field, the observer adjusts the telescope by the tangent screw, so as very nearly to bring the image of the star to the horizontal wire. Finally, just as the star passes the middle vertical wire, he bisects the image of the star with the horizontal wire by a touch of the micrometer screw-head. The circle being now clamped (or made fast), the "reading" is determined as before by reading the pointers and microscopes, and adding or subtracting, as the case may be, the reading of the micrometer. This reading now subtracted from the zenith-reading gives the meridian zenith distance of the star; and this, again, subtracted from 90°, gives its meridian altitude above the horizon.

At the Royal Observatory of Greenwich, the principal observations are now made by an instrument which combines the mural C. with the transit instrument. See TRANSIT INSTRUMENT.

CIRCLE, Quadrature of. See QUADRATURE.

CIRCLES OF THE SPHERE. See ARMILLARY SPHERE.

CIRCUITS (Fr. *circuit*; Lat. *circuitus*, a going round). IN ENGLAND.—England and Wales, with the exception of the county of Middlesex, are divided, for judicial purposes, into eight C., which the 15 judges visit twice or thrice a year, in pairs, for the purpose of adjudging civil and criminal causes. These C. are—the Home, the Midland, the Norfolk, the Oxford, the Northern, the Western, the North Wales, and the South Wales. Criminal charges within the county of Middlesex and the city of London and surrounding district, are disposed of at sessions which are held monthly at the central criminal court. Before and after term, the judges of the superior courts sit for the adjudication of civil causes in the Guildhall of the city of London, with the exception of the Lord Chancellor and the Vice-chancellor, who sit at Lincoln's Inn. "These judges of assize came into use in the room of the ancient justices in eyre, *Justiciarii in itinere*, who were regularly established, if not first appointed, by Parliament of Northampton, 1176 A.D., in the twenty-second year of

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Henry II., with a delegated power from the king's great court, or *aula regia*, being looked upon as members thereof." Stephen's "Com.," Vol. iii., p. 415. See Assize and Nisi Prius.—Ireland is divided into the North-east, the North-west, the Home, the Leinster, Connaught, and Munster circuits. See Ireland, Scotland, Justiciary Court.

CIRCULAR NOTES are bank-notes specially adapted for the use of travellers in foreign countries; and being, in fact, bills personal to the bearer, they are believed to be more safe as travelling money than ordinary notes or coin. C. N. are furnished by the chief London banking-houses. Those who wish to obtain them, determine beforehand what sum of money they will require on their journey, and that they pay to the banker, who, in exchange, gives C. N. to the amount, each of the value of £10 and upwards. Along with these notes is given a "letter of indication." This letter (a lithographed form in French) is addressed to foreign bankers, requesting them to pay the notes presented by the bearer, whom they name, and to aid him in any way in their power. By way of verification, the bearer appends his signature, and the letter is complete. On the back of the letter there is a long list of foreign bankers, extending all over Europe, any of whom will cash one or more of the C. N., on being presented and indorsed by the bearer; the indorsement being of course compared with the signature on the letter of indication, which is at the same time exhibited. In paying these notes, the money of the country is given, according to the course of exchange, and free of any charge for commission. For security, the letter and the notes should not be carried together, in case of being stolen or lost. These C. N. are doubtless a safe and convenient species of money, exchangeable in almost every town visited; and if any remain over on coming home, they will be taken back at their value by the banker who issued them. There are, however, certain drawbacks connected with these notes which every traveller less or more experiences. In many, almost in all instances, there is a difficulty in finding out where the banker named is to be found; for foreign bankers generally occupy obscure apartments several stories high, and not unusually in dingy out-of-the-way alleys. To discover them, a commissionaire may be necessary. Then, in some instances (in Paris invariably), the banker jealously scrutinizes the bearer, asks to see his passport, and takes a note of the hotel at which he lodges; all which may be proper as a precaution against roguery, but it is not pleasant. Further, the C. N. are ordinarily of a thick, stiff kind of paper, which does not well fit into a purse or pocket-book. On these several accounts, the careful class of travellers who keep to the main thoroughfares of France, Germany and Belgium, will find £5 or £10 Bank of England notes and sovereigns or napoleons a preferable kind of money to take on their journey. W. C.

CI'RCULAR NU'MBERS are numbers whose powers end on the same figure as they do themselves; such are numbers ending in 0, 1, 5, 6.

CIRCULAR PARTS, the name given to a rule in spherical trigonometry, invented by Lord Napier. It is to be found in any treatise on that subject.

CIR'CULATING DE'CIMALS. See Decimals.

CIRCULATING LIBRARY, a collection of books lent out on hire—circulated from hand to hand. The plan of lending books on hire is not new. Chevillier, in his "Origines de l'Imprimerie de Paris" (4to, 1694), mentions that, in 1342, a century before the invention of printing, a law was framed in Paris to compel stationers to keep books to be lent on hire, for the special benefit of poor students and others. This fact is alluded to as follows, by E. S. Merryweather, in his entertaining work, "Bibliomania in the Middle Ages" (London, 1849): "The reader will be surprised at the idea of a circulating library in the middle ages, but there can be no doubt of the fact, they were established at Paris, Toulouse, Vienna, and other places. These public librarians, too, were obliged to write out regular catalogues of their books, and hang them up in their shops, with the prices affixed, so that the student might know beforehand what he had to pay for reading them." This writer, quoting from Chevillier, gives a list of books so lent out, with the prices for reading them. The books are all of a theological or classical kind. Among them is the Bible, the perusal of which is set down at 10 sous. "This rate of charge," it is added, "was also fixed

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by the university, and the students borrowing these books were privileged to transcribe them, if they chose; if any of them proved imperfect or faulty, they were denounced by the university, and a fine was imposed upon the bookseller who had lent out the volume." In these arrangements, we see the efforts that were made to procure the use of books before the art of printing had cheapened the cost of literature.

By whom the modern C. L. was projected, there is no record. All that can be given are a few facts on the subject. It is known that Allan Ramsay, author of "The Gentle Shepherd," who was a bookseller in Edinburgh, established a C. L. in that city about 1725. Fond of dramatic literature, Ramsay appears to have incurred some local obloquy by lending out plays; and his wish to introduce a taste for the drama into Edinburgh may accordingly have suggested the notion of a circulating library. Be this as it may, the library which he began was continued through various hands for above a hundred years. At Ramsay's death in 1758, his library was sold to a Mr. Yair, whose widow carried it on till 1780, when it was bought by Mr. James Sibbald, an ingenious inquirer into Scottish literary antiquities. Sibbald lived some years as a literary man in London, during which period, beginning with 1798, the C. L. was carried on, subject to an agreement, by a Mr. Laurie. Sibbald afterwards resumed the direction of the library, which he considerably extended. At his death in 1808, his brother attempted to carry it on; but not being successful in his management, he disposed of it in 1806 to Alexander Mackay, a person of extraordinary energy and perseverance. By the acquisition of various other libraries, Mr. Mackay greatly enlarged the collection, which, under the name of the Edinburgh C. L., he conducted at 154 High Street. Here, by long continued and minute attention to business, Mr. Mackay realised a competency, and he retired from active pursuits in 1831, when this extensive collection of books was broken up and sold by auction.

There are several circulating libraries in London, claiming to be of old date, but probably not so early as 1725. In a late reprint of an old advertisement, we see "Proposals for erecting a Public Circulating Library in London," under date June 12, 1742. This library was to be established "in some convenient place at or near the Royal Exchange;" and the subscription was to be a guinea per annum. Two of the present circulating libraries are believed to be descended from this primitive stock. So numerous had circulating libraries become in the early years of the present century, that they absorbed whole editions of novels and romances prepared for the purpose by a London publishing establishment, designated the Minerva Press. The issue of cheap books and periodicals about 1832 (see BOOK-TRADE) seriously damaged the C. L. system; for people now bought instead of borrowing materials for light reading. The vast increase to the reading public in recent times, and the continually augmenting number of new and popular works of a respectable class, have been the means of restoring prosperity to circulating libraries, more especially in London, where some of them are on a surprisingly gigantic scale. To one library alone, as many as 100,000 new books are said to be added annually, and of kinds very different from those of the old Minerva Press school. The method of reading from these libraries consists in paying a sum per annum—usually a subscription of a guinea—for which a number of new books may at all times be procured, and kept for a specified period. When the books are no longer in demand they are sold at reduced prices.

The method of circulating books among the members of private associations, is noticed under the head BOOK-CLUB; and that of circulating books in rural districts by means of libraries which are shifted from place to place, will be found in the article ITINERATING LIBRARIES. W. C.

CIRCULA'TION, in Anatomy and Physiology, is the term used to designate the course of the blood from the heart to the most minute blood-vessels (the Capillaries, q. v.), and from these back to the heart.

To simplify the consideration of the subject, we shall consider—1. The Anatomy of the Organs of Circulation—and, 2. The Physiology of the Circulation.

1. The organs of C. consist of the heart, arteries, veins, and capillaries. The course of the blood through these organs will be best elucidated by the aid of a dia-

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gram, which is equally applicable for all other mammals as well as for man, and for birds. The shaded part of fig. 1 represents structures filled with impure or venous blood, while the unshaded portion represents structures in which pure, oxygenated, arterial blood occurs. In this diagram we observe a dotted circle, representing a closed bag or sac, termed the pericardium, and enclosing the four cavities *c*, *v*, *c'*, *v'*, of which the heart is composed. Two of these cavities, *c* and *c'* are for the purpose of receiving the blood as it flows into the heart, and are termed the *auricles;* while the two cavities *v* and *v'* are for the purpose of propelling the blood through the lungs and general system respectively, and are termed the *ventricles.* The vessels that transport blood into the auricles are termed *veins*, and the vessels through which the blood is driven onwards from the ventricles are known as *arteries* (q. v.). The diagram further shews that what we commonly term the heart, is in reality *two distinct hearts* in apposition with each other—one, shaded in the figure, which is called the right, or venous, or pulmonary heart; and the other, unshaded, which is called the left, or arterial, or systemic heart—the last name having been given to it, because the blood is sent from it to the general system; just as the right heart is termed pulmonary from its sending blood to the lungs. We will now trace the course of the blood as indicated by the arrows in this diagram, commencing with the right auricle, *c*. The right auricle contracting upon the venous or impure blood with which we suppose it to be filled, drives its contents onwards into the right ventricle *b*, through an opening between these two cavities, called the right auriculo-ventricular opening, which is guarded by a valve, named the tricuspid—from its being composed of three pointed membranous expansions—which almost entirely prevents the regurgitation or reflux of the blood from the ventricle into the auricle. The ventricle *v* being now filled, contracts, and as the blood cannot return into the auricle, it is driven along the shaded vessel, the dividing branches of which are indicated by *f*. This vessel is known as the pulmonary artery, and conveys the blood to the lungs. At its commencement, it is guarded by valves, termed, from their shape, the semilunar pulmonary valves, which entirely prevent the blood which has once been propelled into the pulmonary artery from re-entering the ventricle. The pulmonary artery gradually divides into smaller and smaller branches, which ultimately merge into capillaries. In these capillaries, which are freely distributed over the interior of all the air-cells (of which the lung is mainly composed), the venous blood is brought in contact with atmospheric air, gives off its carbonic acid gas, (which is its principal impurity), and absorbs oxygen, by which processes it is converted into pure or arterial blood. The capillaries, *b*, in which the blood is arterialised, gradually unite to form minute veins, which, again, join to form larger vessels, until finally, the blood is collected into a small number of vessels known as pulmonary veins, which pour their contents into the left auricle. Only one such vessel, *g*, is shewn in the figure, because the main object of this diagramatic scheme is to illustrate the mode and general direction in which the blood circulates, not to indicate the special vessels through which it flows in different parts of the body. The actual number of the pulmonary veins is four—viz., two from each lung. The blood, now fitted for the various purposes of nutrition, enters the left auricle *c'*, which by its contraction propels it into the left ventricle, *v'*, through the left auriculo-ventricular opening. This opening, like the corresponding one in the right heart, is guarded by a valve,

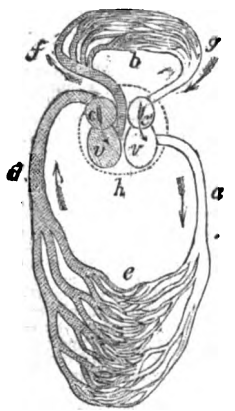

Fig. 1.—Mode of Circulation in Man and other Mammals, and in Birds:

h, heart; *v*, right ventricle; *v'*, left ventricle; *c*, right auricle; *c'*, left auricle: *a*, aorta; *d*, vena cava; *e*, greater circulation; *b*, smaller circulation; *f*, pulmonary artery; *g*, pulmonary veins.

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which, from its form, is termed the mitral valve, and which entirely prevents the reflux of the blood. The left ventricle, *v'*, contracts and drives its contents into the large artery, *a*, which represents the aorta—the great trunk of which, by means of its various branches (none of which are indicated in the diagram), supplies every portion of the body, from the crown of the head to the soles of the feet, with pure arterial blood. From the aorta and its various subdividing branches, the blood passes into the capillaries, *e*, which occur in every part of the system; in these capillaries it undergoes important changes, which may be considered as almost exactly the reverse of those which occur in the pulmonary capillaries: it parts with its oxygen, becomes charged with carbonic acid, and, as it leaves the capillaries, and enters the minute veins formed by their union, presents all the characters of venous blood. The veins gradually unite till they form two large trunks, termed the superior and inferior *venæ cavæ*, which pour their contents into the right auricle—the point from which we started. Only one of these great veins, *d*, is indicated in the diagram. We thus perceive that there is a complete double C.—that there is a lesser C. effected by the blood in its passage from the right to the left heart through the lungs; and that there is a greater C. effected by that fluid in its passage from the left heart through the system generally to the right heart.

From the above simple ideal scheme, we proceed to the consideration of the more complicated arrangements by which the C. is actually effected in man and the higher animals.

The heart is situated in very nearly the centre of the cavity of the chest.

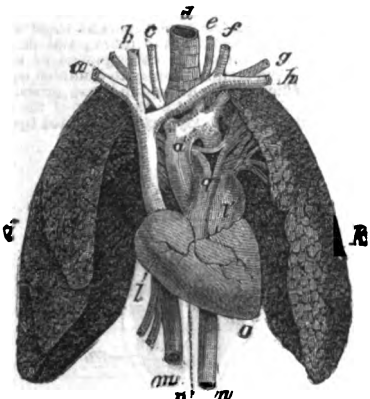

Fig. 2.—The Lungs, Heart, and principal Blood-vessels in Man:

a, *h*, veins from the right and left arms; *b*, *f*, right and left jugular veins, returning the blood from the head and neck—these four veins unite to form a single trunk, the *vena cava superior*, which enters the right auricle, *l*; *c*, *e*, the right and left carotid arteries, the latter rising directly from the arch of the aorta, *d*, the former from a short trunk called the *arteria innominata*; *g*, the left subclavian artery, rising directly from the aorta, while the right subclavian springs from the *ateria innominata*; *d*, the trachea or windpipe; *i*, *k*, the right and left lungs; *l*, *l'*, the right and left auricles; *p*, the right ventricle; *o*, the apex of left ventricle; *m*, the inferior or ascending *vena cava*; *n*, the descending aorta, emerging from behind the heart; *q*, the pulmonary artery.

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thorax, as it is termed in anatomy, between the lungs, behind the breast-bone, or *sternum*, in front of the vertebral column, and above the diaphragm, on which it obliquely rests. Its form is somewhat conical, the lower end tapering almost to a point, and directed rather forwards and to the left. This lower portion alone is movable, and, at each contraction of the heart, it is tilted forwards, and strikes against the walls of the chest between, in man, the fifth and sixth ribs, or a little below the left nipple. All the large vessels connected with the heart—the *venæ cavæ*, the pulmonary artery, and the aorta—arise from its base (see fig. 2), and serve, from their attachment to the neighboring parts, to keep that portion of it fixed. Indeed, these vessels may be regarded as suspending the heart in the cavity, which is lined by a smooth serous membrane, which, near the top, is reflected downwards over the roots of the great vessels, and covers the whole of the outer surface of the heart. These two smooth serous surfaces—one lining the cavity, the other investing the heart—are kept moist by a fluid which they secrete, and by this arrangement, friction may be regarded as reduced to its minimum. The cavity or sac in which the heart lies is called the pericardium. Like all serous membranes, it is a closed sac, and, as it may not be easy for the non-professional reader to understand the relative position of the heart, which is at the same time surrounded by and external to this membrane, we may observe that the head in an old fashioned double night-cap—which is a closed bag—is in much the same position as the heart in the pericardium; it is inside the night-cap, but not in the cavity which intervenes between its two layers.

The substance of the heart is essentially muscular. The fibres run in different directions, longitudinally and transversely, but most of them obliquely; many pass over the apex from one side of the heart to the other; and all are so involved as to render it very difficult to unravel them. In consequence of this arrangement, the fibres, by their contraction, seem simultaneously to diminish each cavity in all directions, and thus serve most efficiently to drive the blood onwards. The size of the heart has been estimated as about that of the closed fist of the same individual. Its weight, as compared with that of the body, was determined by Dr Clendinning to be

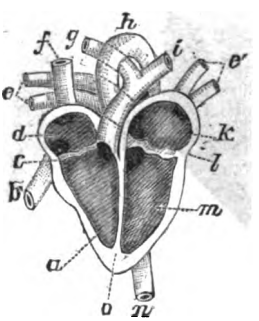

Fig. 8.—Theoretical Section of the human Heart:

f, *b*, the two *venæ cavæ*, opening into *d*, the right auricle; *c*, the tricuspid valve; *a*, the right ventricle, from which proceeds the pulmonary artery, dividing into branches *g* and *i*, going to the right and left lung respectively; *e*, *e'*, the pulmonary veins (two from either lung), entering into the left auricle, *k*; *l*, the mitral valve; *m*, the left ventricle, from which proceeds the aorta, whose arch is indicated by *h*, and the descending portion by *n*, none of its branches being indicated in this figure; *o*, the partition, or *septum*, between the right and left hearts.

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1 : 160 in the male, and 1 : 150 in the female. The same physician carefully examined nearly four hundred hearts of persons of both sexes, and determined the average weight at about 9 oz. avoirdupois, while Dr John Reid found the average weight of the male heart to be a little more than 11 oz., and that of the female heart to be a little above 9 oz.

In our ideal sketch of the organs of C. (fig. 1), we have indicated the different cavities into which the heart is divided. In fig. 3 there is represented a section of the human heart, which is sufficiently like the reality to give the reader a fair idea of the position of its various parts. The two theoretical hearts, which were nearly in contact in fig. 1, are here fused into a single organ, but the division of the two sides is still as complete, in so far as the functions of the heart are concerned, as in the ideal scheme. We see a strong vertical partition separating the entire heart into two halves, which are very similar to each other. In the accompanying figure (fig. 4), we have a representation of all these valves—the auricles having been removed so as to give a distinct view of the upper surface of the ventricles. The tricuspid and mitral valves, which are entirely closed—the two ventricles contracting simultaneously—are represented by 1 and 3 respectively; while the pulmonary and aortic semilunar valves, which when closed, always present a concave surface towards the lungs, are indicated by 4 and 5. The walls of the ventricles are much thicker than

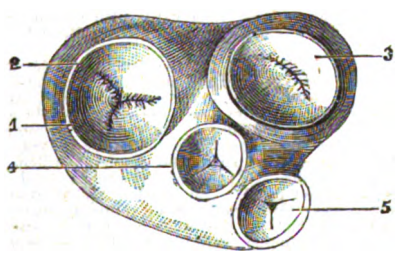

Fig. 4.—Valves of the Heart and Arteries.

Upper surface of the Heart, the Auricles having been removed. In this figure the heart is turned in such a position that the anterior surface lies lowermost; hence the apparent discrepancy of the *right* auriculo-ventricular orifice lying on the *left* side of the diagram.

1, Right auriculo-ventricular orifice, obliterated by the tricuspid valve; 2, fibrous ring surrounding this orifice; 3, left auriculo-ventricular orifice, surrounded by a ring, and closed by the mitral valve; 4, orifice leading into the aorta from the left ventricle, closed by the semilunar valves; 5, orifice leading into the pulmonary artery from the right ventricle, also provided with three semilunar valves.

those of the auricles, and those of the left ventricle are about four times as thick as those of the right; the amount of muscular tissue being, in all these cases, proportional to the work to be done. All details regarding the anatomy of the heart, except such as bear directly upon the C., would be out of place in this article, and we shall, therefore, omit all notice of many structures which present themselves on opening its various cavities. We will merely add, that the heart receives the arterial blood necessary for its own nutrition from the coronary arteries, two trunks which are given off by the aorta immediately above the semilunar valves; and that this blood having discharged its function, is carried back to the right auricle by the coronary veins; this blood obviously having the shortest possible systemic circulation.

Since all the arterial blood leaves the heart through the aortic opening, in tracing its course to the different parts of the system, we obviously have only to follow the aorta to its final branches. Referring to the article AORTA, where the principal

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branches of that great organ are indicated, it is sufficient, without further anatimocal details, to say that the final ramifications of the arteries distribute the arterial blood to the Capillaries (q. v.), which pervade every part of the body.

The *veins*, like the arteries, are found in nearly every tissue; they commence by minute plexuses (an anatomical term for a network-like arrangement), which communicate with the capillaries. Branches from these plexuses uniting together, form small venous trunks, which, by joining, increase in size as they pass onward towards the heart. If we except certain venous structures (called *sinuses*) occurring in the interior of the skull, we may divide the veins into two sets—the *superficial* or *cutaneous*, and the *deep* veins.

The deep veins accompany the arteries, and are usually enclosed in the same sheath of cellular tissue with them. In the case of the smaller arteries, they generally exist in pairs, one on each side the artery, and are called *venæ comites*, while the larger arteries have usually only one accompanying vein.

The superficial veins occur immediately beneath the integument; they not only return the blood from the skin and adjacent structures, but communicate with the deep veins.

All the veins finally unite into two large trunks, termed the *superior* and *inferior vena cava*, which open into the right auricle of the heart; the superior vena cava being formed by the union of the veins which return the blood from the head and neck (the jugulars) with those which convey it from the arms (the subclaviane), as shewn in fig. 2; while the inferior vena cava (also shewn in the same figure) receives the blood from the lower extremities, the trunk, and the abdominal and pelvic viscera.

We must refer to the article VEIN for the structure of the walls of this part of the circulating system. There is only one point that imperatively requires notice here—viz., that while the arterial system presents no valves, except at the points where the two great trunks leave the heart, the veins contain a great number of valves, which are formed by a doubling of their lining membrane, and resemble pocket-like folds or pouches, which allow the blood free passage towards the heart, but prevent its reflux. There is one part of the venous C. which, from its great importance, requires special notice—viz., that of the venous blood of the spleen, pancreas, stomach, and intestinal canal. The blood supplied to these organs by the cœliac axis and the two mesenteric arteries is not returned directly to the vena cava, and thence to the heart, as occurs in the other parts of the system. The veins of these organs unite together into one large vessel, called the *vena portæ*, which entering the liver, branches out again like artery, and finally subdivides into a capillary network that permeates the whole of its mass. It is from the venous blood, as it traverses these capillaries that the bile is secreted. This portal blood together with the blood of the hepatic artery, after it has become venous, is finally carried off by the hepatic veins (usually three in number), which open into the inferior vena cava.* Thus the blood which flows through the portal vein passes through two sets of capillaries, between the period of its leaving the aorta and entering the vena cava.

Our knowledge of the true course of the C.—viz., that the blood propelled from the left side of the heart, after traversing the arteries, returned by the veins to the right side of the heart; and the blood of the right side, passing through the pulmonary artery, traversed the lungs, and returned by the pulmonary veins to the left auricle—is of comparatively recent date. Harvey's celebrated work, "Exercitatio de Motu Cordis et Sanguinis," was not published till 1628, although there is good reason to believe that it was written nine or ten years previously. Before the appearance of this celebrated work, which marks an epoch in physiological science, the views that were held on this subject were so vague that it is unnecessary for us to enter into any notice of them. (The reader who takes an interest in this point is referred to Dr. Willis's "Life of Harvey," prefixed to his translation of Harvey's Works, for the Sydenham Society.) In one point, Harvey's proof of the course taken by the blood was defective; the microscope had not then revealed the exis-

* In fishes, not only the blood of the intestines, but that of the posterior part of the body, enters this portal system, which is distributed in this class of animals both to the kidneys and to the liver.

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tence of the capillaries, and he was consequently altogether at fault as to the mode by which the blood passed from the arteries to the veins. By a strange coincidence, Malpighi, who discovered the corpuscles by which the motion of the blood in the capillaries can be traced, was born in the course of the very year (1628) in which Harvey's work was published.

The double C. which we have described, is the course performed by the blood from the time of birth during the whole period of life. The C. of the blood, however, begins before birth—indeed, at a very early period of intra-uterine or fœtal existence; and the circumstance that before birth the lungs do not act as organs of respiration, induces a very important modification in the course of the blood in fœtal life, which will be described under FŒTUS.

We now leave for the present the C. in man, and proceed to notice some of the leading peculiarities of the C. in other animals. In the warm-blooded animals—mammals and birds—the course of the blood is *essentially* the same as in man, for in all these animals the heart, like the adult human heart, possesses four distinct cavities. In form, however, it presents certain peculiarities in some of the mammalia. It is generally more rounded and less elongated than in man. In the cetacea, it is very broad and flat; and in at least one genus, the dugong, the right and left ventricles are separated by a deep fissure. In some herbivorous mammals, as in the ox, sheep, goat, &c., a cruciform ossification, called the bone of the heart, is found in the septum between the ventricles. In the ornithorhynchus, or duck-billed platypus, the heart, in some respects, resembles that of birds. We likewise find certain varieties in the distribution of the blood-vessels. Thus, while in man the subclavian and carotid arteries arise on the right side from a short common trunk given off by the aorta, and on the left side arise directly from the aorta, we find several varieties of this arrangement in the mammalia. In the horse and the ruminants, the aorta divides at once at its origin into an anterior trunk, which gives off the carotid and subclavian arteries of both sides, and a posterior trunk for the thoracic and abdominal aorta. In the dolphin, and in some—if not all—of the bats, two short trunks (*arteriæ innominatæ*) arise, and give off each a carotid and subclavian on either side. In the elephant, both carotids are given off from a single common trunk, situated midway between the two subclavians. All these, and other varieties which might be noticed, are occasionally found in man; and it may be laid down as a general rule, that when any abnormal arterial distribution is detected in the human subject, it represents the normal type in some lower mammal.

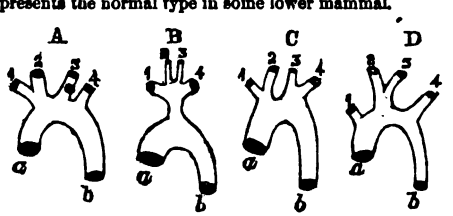

Fig. 5.—Diagram of certain varieties in the Origin of the Main Trunks from the Arch of the Aorta:

A, Man; B, the Ruminants; C, Dolphin and Bats; D, the Elephant. 1, the right subclavian; 2, right carotid; 3, left carotid; 4, left subclavian; *a*, ascending aorta; *b*, descending aorta.

A very remarkable peculiarity in the distribution of the vascular system (both arteries and veins) is exhibited by the cetacea and other diving animals, in which the respiration, and consequently the arterialisation of the blood, is temporarily stopped. Various arteries of the trunk here assume a ramified and convoluted form, so as to constitute reservoirs capable of holding a large quantity of pure blood; while the venous trunks exhibit similar dilatations, capable of receiving and retaining for a considerable time the impure blood which has circulated through the sys-

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tem, and of thus preventing the right heart from being overcharged with venous blood during the temporary suspension of respiration. By means of these arterial reservoirs, the cetacea can support life under water for a quarter of an hour, or even longer.

Another peculiarity deserving of notice is, that occasionally a large artery will divide into a great number of smaller vessels, which again reunite to form a single trunk. An arrangement of this kind is known as a *rete mirabile*, and a good example of it occurs within the skull in long-necked grazing animals, the object being to check too strong a current of blood to the brain.

In birds, the heart is usually of a very large size, as compared with the bulk of the body. The trunk of the aorta is extremely short, and divides into three main branches, the central one forming the descending aorta, while the two lateral ones give off the carotid and subclavian arteries on either side. The branches of the latter give an abundant supply of blood to the powerful thoracic muscles by which the wings are moved.

In the class of reptiles, there is not a complete double C., a mixture of arterial and venous blood being sent both to the lungs and to the general system. In fig. 6, the general nature of the C. in this class is typically represented. The heart consists of two auricles and one ventrical. The impure blood which has circulated through the system is conveyed by the vena cava into the right auricle, from whence it passes into the common ventricle. At the same time, blood which has been aërated in the lungs is poured into it from the left auricle; hence the ventricle contains an admixture of venous and arterial blood. As both a pulmonary artery and an aorta are given off by the ventricle, the latter by its contractions simultaneously drives one portion of its contents to the lungs, and another to the general system. In this way, a semi-oxygenated blood is transmitted to the various parts of the body, the only pure blood being that which is contained in the left auricle, and in the veins opening into it.

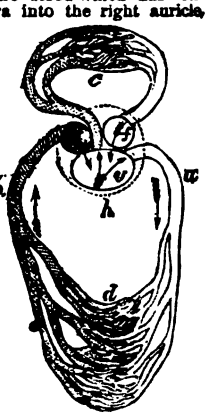

Fig. 6.—Circulation in Reptiles; *h*, heart, enclosed in pericardium; *f*, *f'*, right and left auricles; *v*, single ventricle; *a*, aorta; *b*, vena cava; *c*, smaller circulation; *d*, greater circulat'n.

Although the above may be regarded as the *general* type of the circulating apparatus in reptiles, yet there are many modifications of it (into which we have not space to enter), which connect it on the one hand (in the case of the *Perennibranchiate amphibia*, such as the axolotl, proteus, &c.) with that of fishes, and on the other hand (when there is a more or less perfect separation of the ventricular cavity, as in the crocodiles) with that of birds and mammals.

In the class of fishes, the circulating apparatus is far simpler than in reptiles. The heart possesses only two cavities, an auricle and a ventricle, and is traversed solely by venous blood; hence it is analogous to the right side of the mammalian heart. Venous blood is brought by veins, which correspond with our *venæ cavæ*, from all parts of the system, and enters the auricle (see fig. 7); from the auricle, the blood passes into the ventricle, which is of great muscular strength; and the ventricle propels its contents through a vessel which corresponds with our pulmonary artery, and which dividing on either side into four or five branches, goes to the gills, in the capillaries of which it becomes oxygenated, by means of the air that is diffused through the water. From the filaments and fringe-like structures of the gills, it is at length collected into a large trunk, commonly called the dorsal vessel, but analogous to the aorta of mammals and birds, in so much as it supplies the whole body with arterialised blood. After passing through the systemic capillaries, the blood returns in a venous condition to the heart, and the above process is repeated. Although the heart is simpler than in reptiles, the C. is in one sense of a higher character, in so far as pure arterial (not mixed) blood is here

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conveyed to all parts of the system; hence, probably, the far greater muscular energy of fishes may be explained.

We can only allude very briefly to the C. in the invertebrate animals.

In the mollusca, we find hearts of varying complexity,* usually with one or two auricles, and one ventricle; but in all cases, the auricle or auricles receive aërated blood from the respiratory organs, and pass it to the strongly muscular ventricle, which propels it over the body. The heart is therefore a *systemic* heart. There seem to be no capillaries in these animals, excepting in the respiratory organs; the blood leaving the open ends of the arteries, passes into the interstices (*lacunæ*) of the parenchyma of the body, from whence it is taken up by the open mouths of the venous radicles; hence this kind of C. is called lacunary.

In the crustacea, the form of the heart and the number of its orifices presents several modifications; the following is, however, the *typical* mode of C. of these animals. The heart, which is here a single cavity, is sometimes round, and sometimes long and tubular, and is the point of departure of the arterial system, which

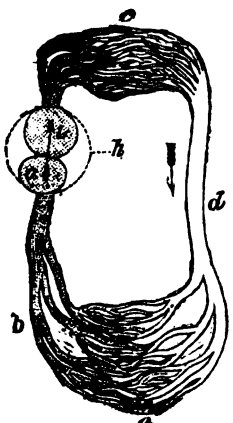

Fig. 7.—Circulation in Fishes:

h, heart, enclosed in pericardium; *a*, the auricle; *v*, the ventricle; *c*, the capillary circulation in the gills; *d*, the dorsal artery; *e*, the systemic capillaries; *b*, the veins.

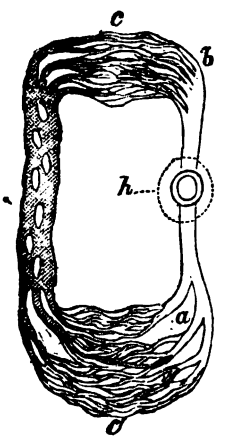

Fig 8.—Circulation in the Crustaceans:

h, the heart and pericardium; *a*, the arteries; *c'*, the systemic capillaries; *c*, the branchial or respiratory capillaries; *b*, the branchio-cardiac vessels.

* In some of the ascidians and in salpa, the following remarkable phenomenon occurs: The heart, which is extremely simple, and of course without valves, at definite intervals (of about twenty minutes) reverses the direction of its current. Before the heart changes the direction of its contractions, it remains still for a short time, and the blood-currents in the body are thus slackened in their course before they receive an impulse in the opposite direction. The vessels entering and leaving the heart thus act alternately as an aorta and as a vena cava.

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consists of trunks emerging in various directions. The blood returning from the arteries does not enter into distinct veins, but into irregular excavations in the tissues, which are termed venous sinuses; from these venous sinuses it passes to the gills, from whence it is returned to the heart in an aërated state by the branchiocardiac canals; so that here, as in the mollusca, the heart is systemic.

It is unnecessary for us to notice the comparatively imperfect C. in insects and animals lower in the scale than those we have already considered.

We now approach the last part of the subject—the physiology of the circulation.

We shall consider—1. The flow of blood through the heart; 2. The phenomena of the arterial C.; 3. The phenomena of the capillary C.; and, 4. The phenomena of the venous circulation.

1. Direct observation and experiment clearly shew, that the muscular contraction of the heart is the principal source of the power by which the blood is propelled in its course. This action of the heart may be observed by opening the chest of a living animal or, better still, of an animal deprived of sensation and motion by poison, and in which artificial respiration is kept up. It is then seen to consist of two motions—first, a contraction or systole of the auricles, and second, a corresponding contraction of the ventricles. The contraction of the auricle immediately precedes that of the ventricle, and the systole of each cavity is directly followed by its diastole or relaxation; there is then a brief period of repose, the heart exhibiting little or no motion. At the moment of the systole of the ventricles, the apex of the heart is tilted forwards, causing a pulsation against the ribs that can be felt externally.

The force exerted by the left ventricle has been so very variously estimated, that we must regard this point as still unsettled. The number of contractions of the heart of an adult in a minute is about 70 or 75; it is, however, liable to great variations, which will be noticed in the article PULSE. The sounds accompanying the heart's action, which may be readily heard by applying the ear either directly or through the medium of the stethoscope to the cardiac region, are discussed in the article HEART, SOUNDS OF THE.

2. The arteries exercise a vast influence on the movement of the blood through them, in virtue of two properties which they possess—viz., elasticity and contractility. These two endowments are not equally and uniformly possessed by the whole arterial system—elasticity (the property by which the interrupted or discontinuous force of the heart is made equable and continuous) existing chiefly in the larger trunks; while contractility—which is more required for regulating the flow of blood to particular parts—is most marked in the smaller vessels. The rate of movement of the blood through the arteries in man can only be roughly calculated from experiments on animals. Volkmann finds that in the carotids of mammals, the average velocity of the blood stream is about 12 inches per second; he has likewise ascertained that the velocity is greater in arteries lying near than in those at a distance from the heart, that it is not increased by an augmentation in the number of pulsations, but that it is greatly augmented by an increase in the volume of the blood, and lessened by its diminution.

3. It has long been a debated point whether the capillary C. is influenced by any other agency than the contractility of the heart and arteries. Harvey believed that the action of the heart alone was sufficient to send the blood through the whole circuit, and in recent times his view has been supported by J. Müller and other eminent physiologists. On the other hand, Professor Draper of New York holds the opposite extreme view, asserting that "it is now on all hands conceded that the heart discharges a very subsidiary duty." We believe that Bichat was the first to maintain the opinion that the capillaries are organs of propulsion, and are alone concerned in returning the blood to the heart through the veins. Although Bichat attributed too great power to the capillaries, there cannot be a doubt that the movement of the blood through these vessels is not solely due to the heart; in short that there is what may be termed a capillary power. The following are a few of the facts proving this to be the case: 1. On watching the C. in the web of a frog's foot, it is at first seen to go on with perfect regularity. After a time, however, various changes are observed, which cannot be attributed to the heart, such as alterations in the size of some capillaries, and in the velocities of the currents passing through

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them, and occasionally even a reversal in the direction of some of the lesser currents. 2. In cool-blooded animals, the movement of the blood in the capillaries continues long after the excision of the heart. 3. Actual processes of secretion not unfrequently continue after death; sweat, for instance, may be exuded from the skin, and other secretions may be formed by their respective glands, which could not take place if the capillary C. had stopped. 4. Cases occasionally occur in which a fœtus without a heart is produced, and yet in these cases most of the organs are well developed.

What the nature of this capillary power is, is not clearly known. Professor Draper and others have endeavored to explain it on the principals of capillary attraction. There is no satisfactory evidence that the capillaries possess true contractility, for, although their diameter is subject to great variations, this may be due simply to the elasticity of their walls. If we could only establish their contractility, the difficulty would be removed.

The rate of movement of the blood through the capillaries is about 1·2 inch per minute in the systemic capillaries of the frog. In the warm-blooded animals it is probably more rapid. From Volkmann's observations, the rate in the dog is about 1·8 inch per minute.

4. It is usually estimated that the venous system contains from two to three times as much blood as the arterial. The latter is probably the more correct ratio, and as the rapidity of blood in the two systems seems to bear an inverse ratio to their respective capacities, the venous blood will move with only one-third of the velocity of arterial blood. We have already noticed the occurrence of valves in the venous circulation. Their object is evidently to prevent the reflux of blood; hence they are of important use in the maintenance of this part of the circulation. They are most abundant where their is much muscular movement. The movement of blood through the veins is undoubtedly mainly due to the *vis a tergo* resulting from the contraction of the heart and arteries. This is much assisted in many parts of the system by the constantly recurring pressure of the adjacent muscles upon their trunks. The movement of inspiration, by causing a comparative vacuum in the chest, has been supposed by some physiologists to assist the flow of venous blood to the heart, and a similar influence has been ascribed to an assumed suction-power of the heart. The contractility of the veins in man is too slight to produce any marked effect on the propulsion of the current. From the investigations of Professor Wharton Jones "on the rhythmical contractility of the veins of the bats's wing," we may infer that, in many of the lower animals, it is probably a more efficient power. In connection with this article, consult ARTERY, CAPILLARIES, PULSE, and VEIN.

CIRCULA'TION OF SAP in plants—its ascent from the root to the leaves and bark, and its partial descent after the elaboration which it undergoes in these organs. The sap drawn from the ground by the roots (see OSMOSIS) ascends in exogenous plants, which have hitherto been principally the subjects of examination, through the more recent parts of the woody tissue, and especially through the albumum. The descent of the sap takes place chiefly through the liber or inner bark. It appears certain also that, on its return to the root, only a small portion is excreted, and that the greater part ascends again, readapted to the use of the plant by the excretion which has taken place. Much of the sap which is taken up by the roots is, however, thrown off in perspiration by the bark and leaves. The sap is also laterally diffused through the cellular tissue of plants, and very interesting observations have been made by Schultz and others on peculiar movements of the elaborated or descending sap (*latex*). Many physiologists dislike the term *circulation* applied to sap, as suggesting a closer analogy than really exists to the circulation of the blood in animals. See PLANT, LEAVES, and SAP.

CIRCUMCI'SION (Lat. a cutting around), the cutting off the foreskin (*præputium*), a rite widely diffused among ancient and modern nations. The prevalent idea among Christians was (and perhaps still is), that the rite originated with Abraham, who (as we read in Gen. xvii. 9—14) was commanded by God to circumcise himself and his whole household, and to transmit the custom to his descendants. But, as Jahn ("Biblische Archäologie," Vienna, 1797—1800) acutely observes, this is inconsistent with the very terms in which the command is expressed, these terms pre-supposing a knowledge of the rite on the part of Abraham. That it existed

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previously to the time of the patriarch, however, seems to be indisputable. The researches of modern scholars prove that the Egyptians, for instance, were in the habit of circumcising long before Abraham was born. Rawlinson, in a note to his version of Herodotus, remarks that "circumcision was already common in Egypt at least as early as the fourth dynasty of kings, and probably earlier, long before the birth of Abraham, or 1996 B.C." The testimony borne by the monuments of Upper and Lower Egypt (consult Sir Gardiner Wilkinson's "Manners and Customs of the Ancient Egyptians") is to the same effect, and apparently conclusive. Another argument which has been adduced against its Abrahamic origin, is the fact of its being so extensively practised. At the present day, it may be traced almost in an unbroken line from China to the Cape of Good Hope. It is also a usage in many of the South Sea Islands, and the followers of Columbus were much astonished to find it existing in the West Indies, and in Mexico. Recently, too, it has been ascertained to have been long practised by several tribes in South America. Such being the case, many scholars hold it impossible to suppose that the origin of so universal a rite can be traced to a single Semitic nation, more especially when that nation was peculiarly averse to intercourse with other nations, and in other respects exercised no overt influence on their customs. Whether, as Jahn supposes, Abraham obtained his knowledge of C. from the Egyptians, we cannot determine. It would appear, however, that the Canaanites among whom he came to reside were not circumcised, for we read of the Prince of Shechem and his people undergoing the operation, that the former might obtain the hand of Dinah, daughter of Jacob; and the institution of it in the family of Abraham was probably sufficient to mark off that family from the surrounding tribes. In the case of Abraham and his descendants, the rite acquired a religious significance. It was ordained to be the token or seal of the everlasting covenant between God and his people. Such is the view of St Paul, who looked upon the C. of the foreskin as symbolical of the C. of the heart; and that along with all that was merely Judaistic and material, it was abrogated by the more spiritual teaching of Christ.

The time for C. among the Jews is the 8th day after the birth of the child; among the Arabians the 13th year, in remembrance, it is said, of their ancestor Ishmael; among the Kaffirs, at a still later period, marking, in fact, the transition from youth to manhood; and, indeed, each nation seems to have selected the time most agreeable to its own notions of what is prudent or becoming. The Abyssinians are the only people professing Christianity among whom C. is practised. The C. of females, or what is equivalent to such, is not unknown among various African nations. For fuller information in regard to C. consult Sonnini's "Travels in Egypt," Sir John Marsham's "Chronicus Canon Ægyptiacus," and Winer's "Biblisches Realwörterbuch."

CIRCU'MFERENCE, or Peri'phery, the curve which encloses a plane figure: thus, we speak of the circumference of a circle, or of an ellipse; but in figures bounded by straight lines, as the triangle, square, and polygon, the term *perimeter* is employed to designate the whole bounding lines taken together.

CIRCUMNAVIGA'TION, the term usually applied to the act of sailing round the world, its literal meaning being simply a sailing round. The C. of the globe was at one time considered a great feat, but it is now regarded as one of the most commonplace affairs in a sailor's experience. The first to circumnavigate the globe was Magalhaens (q. v.), or Magellan, a Portuguese, in 1519; eighteen years afterwards, it was accomplished by a Spaniard: and in 1577 by the illustrious Englishman, Drake. The most celebrated of circumnavigators, however, was Captain James Cook, who, between 1768 and 1779, made three voyages round the world.

CIRUMSTA'NTIAL E'VIDENCE. See EVIDENCE.

CIRCUMVALLA'TION, in Fortification, is a series of works surrounding a place when under siege; not to serve offensively against the place, but to defend the siege-army from an attack from without. It usually consist of a chain of redoubts, either isolated or connected by a line of parapet. Such lines were much used in the sieges of the ancient and middle-ages; but in modern times they are not so necessary, because the use of artillery lessens the duration of a siege, and also because the besiegers have generally a corps of observation in the open field, ready to repel any force of the enemy about to succor the besieged. A remarkable example of C. was

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that of Sebastopol, where, while a circuit of batteries fired upon the the town, an outer circuit of redoubts and lines kept off the Russians who were in the open field: but the necessity for this arose out of the smallness of the besieging force compared with that of the besieged. The narrow escape of the allies from utter overthrow at Inkermann, shewed the necessity for this external defence. For the relation which C. bears to COUNTERVALLATION, see that article.

CIRCUMVE'NTION. See FRAUD.

CI'RCUS. See HARRIER.

CIRCUS, The, of ancient Rome, was a large oblong building, adapted for chariot-races and horse-races, and used also for the exhibition of athletic exercises, mock contests, and conflicts of wild beasts. The Circensian Games were alleged by tradition to have originated in the time of Romulus, when they were dedicated to Consus or Neptune, and called *Consualia*. After the first war undertaken by Tarquinius Priscus, in which he captured the Latin city of Apiolæ, his victory was celebrated by games. A space was marked out for a C., and the senators and knights were allowed to erect scaffoldings round it for themselves. The games continued to be held annually, and a permanent edifice was soon afterwards constructed. This was distinguished, subsequent to the erection of the Flaminian and other large circl. as the Circus Maximus. It must have been altered and enlarged at various times. According to different computations, it was capable of holding 150,000, 260,000, or 385,000 persons. Its extent also has been variously estimated. In the time of Julius Cæsar, it was three stadia or 1875 feet long, and one stadium or 625 feet wide, while the depth of the buildings surrounding the open space was half a stadium, or about 312 feet. All the circi in Rome, of which there were a considerable number, are now completely destroyed; but a small C. on the Appian Way, about two miles from Rome, known as the Circus of Caracalla, is still in a state of preservation. Its construction is believed to have differed very little from that of similar buildings.

Along the sides and at the curved end were ascending ranges of stone seats for the spectators. At the other end were the *carceres*, or stalls, which were covered, and furnished with gates, and in which the horses and chariots remained until, on a given signal, the gates were simultaneously flung open. In the centre is the *spina*, a long and broad wall round which the charioteers drove, terminating at both ends at the *metæ*, or goals—three cones of carved wood which marked the turnings of the course. At each extremity of the *carceres* is a stone tower. From its gates and castellated appearance, the whole of this side received the name of *oppidum*, a town. Over the *carceres* were seats for the president of the games, the consuls, or other distinguished persons. There were four entrances, of which the most important were the *Porta Pompæ*, and the *Porta Triumphalis*. The games were inaugurated by a procession from the Capitol, in which those bearing the images of the gods went first, and were followed by the performers in the games, the consuls, and others. This procession entered through the *Porta Pompæ*, while the *Porta Triumphalis* was that by which the victors left the circus.

The *spina*, an object conspicuous from its situation, was in general highly decorated by such objects as statues, small temples, altars, &c. In the *spina* of the Circus Maximus, two very large obelisks were erected by Augustus and Constantius. This C. was also distinguished by six towers, and by a canal or *euripus*, formed by Julius Cæsar, to protect the spectators more effectually during the conflicts of wild beasts.

The C. was especially adapted for races, an amusement of which the Romans were passionately fond. The length of a race was seven circuits round the *spina*, and 25 races were run in each day. The number of chariots was usually four. The charioteers adopted different colors, representing the four seasons. Bets and party-spirit ran high, and the victor received a substantial pecuniary reward at the end of the race. The athletic exercises, such as boxing and wrestling, which sometimes terminated fatally, were probably exhibited in the large open space between the *carceres* and the *spina*. The *Ludus Trojæ* was a mock-conflict between young men on horseback. A regular battle was sometimes represented (*Pugna Equestris et Pedestris*). By the formation of canals and the introduction of vessels, a *Naumachia*, or sea-fight, was occasionally exhibited; but, under the empire, this species of exhibition, as well as the *Venatio*, was gradually transferred to the Amphitheatre (q. v.). In providing for the *Venatio*, or hunting of wild beasts, vast sums of money

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were expended. Animals were procured from every available part of the Roman empire, including Africa and Asia. The exhibition not only afforded an opportunity for the display of private munificence or ostentation, but attained the importance of a political engine, which none who aspired to popularity ventured to overlook. When Pompey opened his new theatre, he is said to have given public exhibitions in the C. for five days, during which 500 lions and 20 elephants were destroyed.

In modern times, the C. stands but as the shadow of a name. It is about the same size as the modern theatre, and is employed principally for the exhibition of feats of horsemanship and for acrobatic displays.

CI'RENCESTER, or Ci'cester, a parliamentary borough in Gloucestershire, on the Churn, an upper branch of the Thames, and on the Thames and Severn Canal, 17 miles south-east of Gloucester. It has four chief streets, and the appearance of opulence, though it has but little trade. A complete agricultural college was founded here in 1846 on a farm of 600 acres. Pop. (1871) 7681. C. returns one member to parliament. C. was the Roman *Corinium Cesaster*, at the junction of five Roman roads, and has traces of ancient walls two miles in circuit. Roman relics have been found here, as coins, urns, baths. Canute held a council here in 1020 to expel Ethelwolf. Rupert stormed C. in 1642 and 1643, and it was afterwards given up to Essex.

CIRRHO'PODA, or Cirri'peda (Gr. or Lat. cirrhus-footed), the animals which formed the genus *Lepas* of Linnæus, ranked by him among the multi-valve *Testacea*, and by subsequent naturalists very generally regarded as an order of mollusks, until, in consequence of recent discoveries, a place has been assigned them among the *Articulata*, either as a distinct class of that great division of the Animal Kingdom, or as a sub-class of *Crustacea*. Barnacles (q. v.) and *Balani* or Acorn-shells (see BALANUS) are the most familiar examples of C.; but many species are now known, all exhibiting much general similarity to these, all marine, and all in their mature state permanently attached to objects of various kinds, as rocks, sea-weeds, shells, &c. Some are found imbedded in corals, others in the thick skin of whales, some in the flesh of sharks. They are distributed over the whole world; the species, however, are not numerous anywhere; those species which adhere to fixed bodies are in general much more limited in their geographic range than those which attach themselves to floating objects or to vertebrate animals. They are generally divided into two orders, *Pedunculated* and *Sessile*, those of the former order being supported on a flexible stalk, which is wanting in the latter. Barnacles are pedunculated C., and *Balani* are sessile.

The resemblance of C. to mollusks consists chiefly in their external appearance. In the more important parts of their organisation, however, the C. resemble crustaceans rather than mollusks. The gills, when these exist, occupy the same relative position as in crustaceans; but the aëration of the blood is supposed to be also effected in the *cirrhi*, as the limbs or organs have been generally called, of which there are six pair on each side, and which may be described as long tapering arms, each composed of many joints and *ciliated* or fringed with stiff hairs. The *cirrhi* nearest the mouth are shortest, and all of them together form a sort of net for the capture of minute animals, being incessantly thrown out by the cirrhopod from a lateral opening of its sac, and drawn in again in such a manner as to convey any prey which they may have caught to the mouth. Almost all the C. are hermaphrodite; but in a few genera the sexes are distinct, and these exhibit an anomaly of a very remarkable kind, the males being not only very small in comparison with the females, and more short-lived, but, in their mature state, *parasitic* on the females, or attached to them as they are to other objects; whilst in some the still more remarkable anomaly appears of what have been called *complemental* males, attached in this way to hermaphrodites. The eggs of C. are hatched before being finally set free from the body of the parent. The young possess the power of locomotion, swimming freely in the water, and are furnished with eyes, which disappear after they have permanently fixed themselves, by instinctive choice, in situations adapted to their kind. They have also shells, quite different from those of their mature state. The shelly coverings of the C. are all formed according to a certain type, but with many variations, and they differ extremely in the number of pieces or valves of which they consist, some, as the common barnacles, having only five valves, and

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others having additional small pieces arranged in whorls, and exceeding 100 in number. In most of the C., the shelly covering is very complete; in some, it is almost rudimentary.

The most important discoveries concerning the structure and metamorphoses of the C., determining their place in the animal kingdom, were made by Mr. J. V. Thompson. For the most extended examination of species, and for an admirable monograph, published by the Ray Society, the scientific world is indebted to Mr Darwin.

CI'RRHUS, Ci'rrus (Lat. a curl, or lock of hair), or Te'ndril, in Botany, a leaf altered into a slender spiral, which, by twisting around such objects as it comes in contact with, attaches the plant to them, and enables it to climb, when otherwise, through the weakness of its stem, it must have been prostrate. There are many varieties of C., as it is merely an elongation of the midrib of a pinnate leaf—an altered terminal leaflet, or becomes compound by the alteration of several leaflets, or occupies altogether the place of a simple or compound leaf, and is accordingly either simple or branching. Examples of different kinds may be seen in the pea, vetch, vine, passion-flower, &c.—The term C. is also employed in zoology, to designate any curled filament, and has been applied, but not quite aptly to the curiously modified feet of the *Cirrhopoda*.

CI'RRUS. See CLOUDS.

CIS, a Latin preposition meaning, "on this side," which is often prefixed to names of rivers and mountains to form adjectives; Cisalpine. Cispadane, "on this side of the Alps," "of the Po." As most of these words are of Roman origin, Rome is considered the point of departure.

CISA'LPINE REPU'BLIC. After the battle of Lodi, in May 1796, General Bonaparte proceeded to organise two states—one on the south of the Po, the Cispadane Republic, and one on the north, the Transpadane. These two, however, were in 1797 united into one under the title of the C. R., which embraced Lombardy, Mantua, Bergamo, Brescia, Cremona, Verona, and Rovigo, the duchy of Modena, the principality of Massa and Carrara, and the three legations of Bologna, Ferrara, and the Romagna. The republic had a territory of more than 16,000 square miles, and a population of 3½ millions. Milan was the seat of the government or Directory, and the place of meeting of the Legislative Assembly, which was composed of a senate of 80 members, and a great council of 160. The army consisted of 20,000 French troops, paid by the republic. A more intimate connection was formed in 1798 between the new republic and France, by an alliance offensive and defensive, and a treaty of commerce. The republic was dissolved for a time in 1799 by the victories of the Russians and Austrians, but was restored by Bonaparte after the victory of Marengo, with some modifications of constitution and increase of territory. In 1802 it took the name of the Italian Republic, and chose Bonaparte for its president. A deputation from the republic in 1805 conferred on the Emperor Napoleon the title of King of Italy; after which it formed the kingdom of Italy till 1814.

CISSA'MPELOS (Gr. ivy-vine), a genus of plants of the natural order *Menispermaceæ*, of which some of the species possess valuable medicinal properties; particularly *C. Pareira*, a native of the West Indies and warm parts of America, the root of which is known by the names of *Pareira Brava* and *Butua Root*. The plant is called Velvet Leaf in the West Indies, from the peculiar and beautiful appearance of the leaves. It is a climbing shrub, with roundish-triangular leaves, racemes of small yellow flowers, and small hairy scarlet berries. The root appears in commerce in pieces of two or three feet long, varying from the thickness of the finger to that of the arm, tough, but so porous that air can be blown from end to end of it. It has a sweetish, afterwards nauseous taste; is used as a tonic and diuretic, appears to exercise a specific influence over the mucus membrane of the urinary passages, and is administered with advantage in chronic inflammation of the bladder. It was formerly supposed to possess great lithontriptic powers, which it was even hoped would put an end to all necessity for lithotomy. It is supposed that the roots of other plants of the same order are often fraudulently mingled with it; but those of several species of C., both American and East Indian, appear

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to possess pretty nearly the same properties. An Alkaloid, called *Cissampelin*, exists in this root, and gives it its properties.

CI'SSOID OF DI'OCLÉS, a curve first employed by Diocles the mathematician, whose name it bears, for the purpose of solving two celebrated problems in geometry—viz., the trisection of a plane angle, and the construction of two geometrical means between two given straight lines. The curve may be constructed mechanically. The area of the space included between the two branches and their asymptote, is equal to three times the area of the generating circle. If, instead of a circle, we employed any other curve as the generating curve, the curve generated in the same way as the C. of D., is called *cissoidal*. The word cissoid comes from the Greek *cissos*, ivy, and *eidos*, form.

CI'SSUS. See VITACEÆ.

CISTE'RCIANS, a religious order, taking its name from the parent monastery of Citeaux (Cistercium), near Dijon, which was founded in 1098 by the Benedictine abbot, Robert of Molême. Through the influence chiefly of St Bernard of Clairvaux, who became a monk of Citeaux in 1113, the order, within little more than a century after its foundation, was in possession of more than 1800 abbeys in France, Germany, England, Ireland, Denmark, Norway, and Sweden. The C. were distinguished from the order of Cluny by their severer rule and stricter poverty, avoiding everything like splendor in their churches, even gold and silver crosses; by being submissive to the jurisdiction of the bishops, at least till after the death of St. Bernard; by not meddling with the cure of souls; by wearing a white robe with a black scapulary; and by their peculiar form of government, which was introduced by Innocent III., in 1215, into all the monastic orders. In France, the members of this order called themselves Bernardines, in honor of St Bernard. Among the fraternities emanating from the C., the most remarkable were the Barefooted monks or Feuillans, and the nuns of Port Royal in France, the Recollets or reformed Cistercian nuns in Spain, and the Trappists. The number of Cistercian abbeys in England, in the reign of Henry VIII., was 75, besides 26 Cistercian nunneries. In Scotland, there were 11 abbeys, and 7 nunneries. Among the English abbeys were Woburn, Tintern, Furness, Fountains, Kirkstall, and Rievaux; among the Scottish, Melrose, Dundrennan, Kinloss, Glenluce, Culross, Deer, Balmerino, and Sweetheart or New Abbey. The chief French abbeys, *les quatre premières filles de Citeaux*, as they were called, were La Ferté, Pontigny, Clairvaux, and Morimond. Riches and indolence brought this powerful order, as well as others, into decay. Even before the Reformation, many of their convents had ceased to exist. The French Revolution reduced the C. to a few convents in Spain, Poland, Austria, and Saxony.

CI'STERN, a tank for holding water. In places where the supply of water is intermittent or where rain-water is used, every house requires a C. or water-butt. Cisterns are much used for the supply of steam-engine boilers at railway-stations. They are variously constructed—many of cast or wrought iron, or deal lined with lead or zinc, or of impervious pavement or slate slabs, in which last two cases the sides and bottom are grooved, and cemented together with white-lead putty, or some other cohesive substance, to prevent leakage; and the sides, if the dimensions be at all large, are frequently bound together by means of wrought-iron rods; but very large cisterns are generally made cylindrical, so that the pressure acting at all points equally from the centre, the strain comes longitudinally on the outside, and tie-rods can be dispensed with, which is an advantage, as the holes for the tie-rods are apt to be a cause of leakage. See WATER SUPPLY.

CI'STUS (Gr.), or Ro'ck rose, agenus of exogenous plants, which gives its name to the natural order *Cistaceæ;* an order allied to *Cruciferæ* and *Capparideæ*, and containing about 200 known species of shrubs and herbaceous plants, chiefly natives of the south of Europe and north of Africa. The flowers have generally five petals, very delicate; the stamens are numerous, the style simple, the fruit a capsule. Many species of this order are more or less resinous; and from the twigs of some species of *Cistus*, natives of the south of Europe and the Levant, particularly *C. Creticus*, *C. Cyprius*, and *C. ladaniferus*, the resinous substance called *Ladanum* is obtained, which is used as a stimulant, chiefly in plasters, but has become obsolete in British medical practice. Many species of *Cistus* are much cultivated

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for the beauty of their flowers, which are red, white, lilac, yellow, or frequently of two colors, and are common in gardens and green-houses. Most of the larger kinds require in Britain some protection in winter. The only plant of the order which extends to Scotland is *Helianthemum vulgare*, the yellow flowers of which are a frequent ornament of dry hill-slopes.

CI'TADEL (from the Italian *cittadillo*, "a little city") is a fort of four or five bastions, in or near a town. A C. serves two purposes: it enables the garrison of a town to keep the inhabitants in subjection; and, in case of a siege, it forms a place of retreat for the defenders and enables them to hold out after the rest of the town has been captured. A C. must fully command the fortifications of the city, and have a large space round it clear of buildings.

CITA'TION, the act of calling a party into court to answer to an action, to give evidence, or to perform some other judicial act. Being derived from the civil law, the term C. is known in England chiefly or exclusively in the ecclesiastical courts. But it is in frequent use in the legal systems both of France and Scotland. In Scotland, a C. is done in the Court of Session by an officer of court, or by a Messenger-at-arms (q. v.), under authority either of a summons passing the Signet (q. v.), or under a warrant by the court. In inferior courts, no summons, complaint, or decree is now validly served by affixing it to the door of the house, except where the defender has left, and his address is unknown; and no witness is necessary to the service except in poinding, sequestrating, or charging (34 and 35 Vict. c. 42).

Where the party, though amenable to the court, is not resident in Scotland, he must be cited edictally by a copy of the C. being left at the office of the keeper of edictal citations (see EDICTAL CITATION), by whom lists of such citations are printed and published. Formerly, this C. was effected by a proclamation at the market-cross of Edinburgh, and the pier and shore of Leith.

In criminal cases, the party cannot appear voluntarily in court; he must be cited, and can plead any omission in form, which cannot be obviated even by consent. This form of C. is regulated by 9 Geo. IV c. 29, commonly called Sir William Rae's Act. A full and correct copy of the libel, or charge against him, must be served on the panel, or accused, with a list of witnesses, and of the assize, or jury. A notice, intimating the day of compearance, must be marked on the copy of the libel, and subscribed by the officer and a witness. This C. must proceed on a warrant issuing from the court before which the accused is to be tried. It may be executed either by a Macer (q. v.), a Messenger-at-arms (q. v.), or a Sheriff-officer (q. v.) of the county within which the C. is made (11 and 12 Vict. c. 79, s. 6). If the panel can be found personally, the C. must be delivered to him, but if not, it must be left at his dwelling-place with his wife or servants; or if access cannot be obtained, the officer must affix a copy to the principal door of the house (1555, c. 33).

CITATION FOR INTERRUPTING PRESCRIPTION.—Either the positive or negative prescription may be interrupted by citation in an action. See PRESCRIPTION.

CI'TIZEN (Fr. *citoyen*, Lat. *civis*). Aristotle defines a C. to be one to whom belongs the right of taking part both in the deliberative, or legislative, and in the judicial proceedings of the community of which he is a member ("Politics," iii. 1). A C., therefore, can exist only in a free state. Between a C. and a subject there is this distinction, that whilst the latter merely is governed, the former also governs; and thus, though every C. is a subject, many subjects are not citizens. In this, which was also the sense attached to the term by the Romans, when used in its highest meaning—that, viz., of the *civis optimo jure*—it has passed to the modern world, gradually coming to be so understood everywhere. In the heroic ages of Greece, the idea of citizenship was but imperfectly understood. The members of the council and assembly were mere advisers of the kings, who, as god-descended, were regarded as monarchs in the strict sense. But something of the C. character even then attached to the immediate followers of the chief, when regarded in opposition to slaves and strangers; and it was from them that the dominant class sprang, which everywhere overthrew the monarchies, and established the small self-governing states—the democracies, or rather aristocracies, of Greece. At first, the rights of citizenship in Athens and other Greek communities were readily attained by those who were not born to them; but at a later period, when the organisation of Greek civic life had reached a high degree of perfection, admission to the roll of citizens was

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procured with great difficulty. In Sparta, indeed, according to Herodotus, so sparing were they of their national privileges, that there were only two instances of their conferring them in their full measure on strangers. The Perioeci, or strangers by origin, who shared the Spartan territory, though not on equal terms with the Spartans, were probably, as regarded political rights, pretty much in the same position with the Roman plebeians. In Rome, there were perfect and less perfect citizens, whose respective positions are thus described by Savigny in his "History of the Roman Law in the Middle Ages:" "In the free republic, there were two classes of Roman citizens—one that had—and the other that had not, a share in the sovereign power. That which peculiarly distinguished the higher class, was the right to vote in a tribe, and the capacity of enjoying magistracy." All the private rights of citizenship (the *jus connubii* and *jus commercii*) belonged to the citizens of the lower class, but the public rights of voting in a tribe, and of enjoying the honors of the magistracy (*suffragium et honores*), were denied them. Under these two classes, again, there were two others—the Latini and the Peregrini.

Roman citizenship was acquired most commonly by birth, but for this, it was requisite that both father and mother should be citizens. If a C. married a Latina, or a Peregrina, even believing her to be a C., the children begotten of the marriage followed the status of the mother. But latterly, it was permitted, by a decree of the senate, to the parents to prove their mistake, and thus to raise both the mother and her children to the rank of citizens. In earlier times, the citizenship could be conferred on a stranger only by means of a *lex*—i. e., by a vote of the people assembled either in one or other of the Comitia (q. v.). It was conferred at a single sweep on the whole of the Latini and Socii. In the case of some of the provinces, both in Italy and Gaul, the *Latinitas* was given as a step to the *Civitas*, the former being converted into the latter in the case of any one who had exercised a magistracy in his own state or city.

When the imperial power was established, the public rights which formed the chief characteristic of the full Roman citizenship, became little more than empty names; and the only value which thenceforth attached to it consisted in the private rights which it conferred. Such as it was, the constitution of Caracalla extended it to the whole Roman world, the distinctions between Cives and Peregrini and Latini being preserved only in the case of certain individuals, such as freedmen and their children. Even this distinction was abolished by the legislation of Justinian, the only divisions of persons henceforth being into subjects and slaves. A fuller account of this interesting subject will be found in Smith's "Dictionary of Greek and Roman Antiquities."

In its modern use, the term C. is applied in Great Britain to a dweller in a town, and this either in the general sense of an inhabitant, or in the narrower and stricter sense of one who enjoys its privileges and franchises. In France, it denotes any one who is born in the country, or naturalised in it; and in America, it is used in the same sense, but so long as slavery was an institution there, slaves were not included in the title. In this latter acceptation, it is equivalent to the term *subject* in England.

CI'TRIC A'CID is an organic acid present to a considerable extent in limes and lemons, and to a less extent in gooseberries, currants, raspberries, strawberries, and other fruits. In preparing C. A. the juice is allowed to ferment, and chalk being added, a precipitate of citrate of lime is formed. This precipitate being treated with sulphuric acid, sulphate of lime is formed, and the acid remains in solution. It is a tribasic acid, having the symbol $C_{12}H_5O_{11}$. It is readily soluble in water, and has an intensely sour taste; it is used in medicine, especially in the form of lemon-juice, as an antiscorbutic, and in the arts by the silk-dyer to heighten the colors of safflower and cochineal, and by the calico-printer for discharging mordants from cloth. C. A. is a constituent of the finer kinds of lemonade, ginger-beer, &c.

Ci'tric Acid ($C_{12}H_8O_{14}$, or $C_{12}H_5O_{11},3HO$) is a powerful tribasic acid, which crystallises in large transparent colorless prisms. These crystals are readily soluble in water and alcohol, but are insoluble in ether. The crystals contain two atoms of water of crystallisation (not expressed in the above formulæ), which are expelled at a temperature of 212°. Citric acid has a strongly acid taste and reaction, and displaces carbonic acid from the carbonates. Its watery solution quickly

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becomes mouldy on exposure to the air, and the acid is then found to be converted into acetic acid. When heated to about 350°, vapor of acetone and carbonic oxide are given off, and a residue of aconitic acid ($C_{12}H_6O_{12}$), an acid occurring in the leaves and roots of monkshood and other species of Aconite, is left; and when fused with potash, it assimilates the elements of water, and is decomposed into oxalic and acetic acids, as shewn in the equation:

Citric Acid. Oxalic Acid. Acetic Acid.

$$\overbrace{C_{12}H_8O_{14}} + 2HO = \overbrace{C_4H_2O_4} + \overbrace{2C_4H_4O_4}.$$

These reactions illustrate the changes which organic acids naturally undergo in the vegetable kingdom. It is to the presence of citric acid that a great many fruits owe their agreeable acidity. It occurs in a free state either alone or associated with malic and tartaric acids in oranges, lemons, cherries, currants, raspberries, gooseberries, strawberries, whortleberries, &c., and in several tubers and bulbs, as in the potato and onion. It also exists in combination with potash or lime in potatoes, onions and artichokes.

This acid, which is almost always prepared from lemon or lime juice, is thus obtained. The juice, after undergoing incipient fermentation, is filtered, and neutralised with chalk; and the insoluble citrate of lime thus formed is decomposed with very dilute sulphuric acid. On the removal of the sulphate of lime that is thus formed by filtration, the solution of citric acid must be concentrated till a film begins to form, when the crystals readily separate on cooling. Citric acid has also been prepared from unripe gooseberries, whose juice is allowed to ferment; and after the removal of the alcohol by distillation, the acid is separated in the way already described. 100 lbs. of gooseberries yield 10 lbs. of spirit of spec. grav. 0·928, and 1 lb. of crystallised acid.

Citric acid is used largely in manufactures; calico-printers employ it for discharging the mordant from the cloth in patterns; and it is used in dyeing silk with safflower, and for heightening the tint of cochineal. The raw material from which the acid for these purposes is obtained "is a black fluid like thin treacle, which comes from Sicily, and is obtained by inspissating the expressed juice of the lemon after the rind has been removed for the sake of the essential oil."—Watt's "Dictionary of Chemistry," vol. i. p. 995.

The most important of the numerous salts of citric acid are the citrates of lime, potash, ammonia, and iron. *Citrate of Lime* ($C_{12}H_5O_{11}$, 3CaO + 4Aq) is formed in the preparation of citric acid, and is a fine white crystalline powder, more soluble in cold than in hot water. *Citrate of Potash* ($C_{12}H_5O_{11}$, 3KO + 2Aq) is formed by neutralising the acid with carbonate of potash, and crystallises in clear deliquescent needles, insoluble in alcohol. *Citrate of Ammonia* ($C_{12}H_5O_{11}$, $3NH_4O$) can only be obtained in solution. *Citrate of Iron* is prepared by dissolving freshly precipitated peroxide of iron in a warm solution of citric acid; a reddish-brown solution is formed, which, on evaporation, yields brilliant scales of a light-brown color. Excepting the first, all these salts are employed in medicine—the citrates of potash and ammonia as diaphoretics and febrifuges (see AERATED WATERS), and the citrate of iron as a tonic. Lemon juice, in which citric acid is the most active ingredient, is a most valuable medicine in scurvy, active hæmorrhage, rheumatism, &c.; and when it cannot be obtained, citric acid is the best substitute. The general uses of citric acid in combination with an alkali have been already noticed.

CITRON (*Citrus medica*; see CITRUS), a tree cultivated in the south of Europe, and other warm, temperate, or sub-tropical countries for its fruit; a native of the forests of the north of India. By many botanists, it is regarded as a mere variety (or perhaps the original type) of the species which produces also the lemon, sweet lemon, lime, and sweet lime; by others, these, or some of them, are regarded as distinct species. The C. has oblong toothed leaves; the flowers are externally of a violet color; the fruit is large, warted, and furrowed; the rind very thick and tender; the pulp sub-acid. The pulp is refrigerant; but the part chiefly valued is the rind, which has a delicious odor and flavor, and is made into a very agreeable preserve. The juice is sometimes employed to make a syrup, or, with sugar and water, for a beverage, and for flavoring liquors. The rind and juice may be said generally to be applicable to the same purposes as those of the lemon, but the juice

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is less acid. The CEDRATE is a variety of the C., from which chiefly the fragrant oil of C., or OIL OF CEDRATE, used by perfumers, is procured. In Germany, the the name Cedrate is extended to all kinds of C., and the name C. is usually given to the lemon. The varieties of C. are numerous. The fruit of the largest kinds is sometimes 9 inches long, and 20 lbs. in weight. The C. is frequently cultivated in Britain, and by the aid of artificial heat and the protection of glass is produced in great perfection.

It is probable that the C. is meant in some passages of the Old Testament where the word apple is used in the English version.

CITRO'SMA, a genus of trees of the natural order *Monimiaceæ*, of which the leaves abound in an oil resembling, if not identical with, oil of citron. They are natives of the tropical parts of South America.

CI'TRUS, a genus of plants of the natural order *Aurantiaceæ*, consisting of trees and shrubs, natives of India and other warm parts of Asia, but many of which are now commonly cultivated in all warm climates on account of their fruit. To this genus belong the ORANGE, CITRON, LEMON, LIME, BERGAMOT, SHADDOCK, POMPELMOOSE, FORBIDDEN FRUIT, &c. See these heads. It is distinguished by numerous stamens, irregularly united in bundles by their filaments, a pulpy fruit with a spongy rind, and smooth seeds. The leaves and the rind of the fruit abound in volatile oil. The flowers also contain volatile oil, and exhale a peculiar fragrance.

CITTADE'LLA, a town of Northern Italy, in the province of Padua, 14 miles northeast of Vicenza. It is situated on the Brentella, an affluent of the Brenta, is walled, and has woollen and paper manufactures. Pop. 7820.

CITTA' DI CASTE'LLO, a town of Central Italy, 25 miles north-west of Perugia. C. has a very pleasant situation on the left bank of the Tiber. Though a place of only some 6580 inhabitants, it is exceedingly rich in ecclesiastical structures of Gothic architecture, palatial residences, and works of art. Raphael painted many of his early works in C. di C.; and they were to be found in churches and private galleries here until the French invasion, when they were dispersed. Two small pictures of this great master still remain in Citta di Castello. Silk-twist is the chief manufacture of the town.

CITTA VE'CCHIA. See MALTA.

CI'TY (Fr. *cité* Lat. *civitas*). In the sense in which it was first used in the Romanic languages of modern Europe, the word C., like its Latin original, was probably equivalent to State (q. v.) (*respublica*) rather than to town or borough (*urbs, municipium*); and whilst the latter signified a collection of hearths and households, governed by municipal laws internally, but subject externally to the laws of the country of which they formed a part, the former was applied only to such towns as, with their surrounding district, were independent of any external authority whatever. Nearly the only cities in this sense now are the free towns of Germany, and such of the cantons of Switzerland as consist chiefly of a town and its surroundings, for example, Geneva. But as the ancient Gauls, though composing one nation, were divided into tribes, living in different cantons, each with its town, to which the term *civitas* was applied, and as they also acknowledged a species of central authority, several cities sending delegates to a central one of greater extent and importance to discuss their common affairs, there is reason to believe that the term C. was applied *par excellence* to these central places of meeting, and that it thus, from a very early period, signified a *capital* or *metropolis*, though not independent. In England, the term is said to be confined to towns or boroughs which are or have been the seats of bishops' sees, but this restriction rests on no sufficient ground. "The cities of this kingdom are certain towns of principal note and importance, all of which either are or have been sees of bishops; yet there seems to be no necessary connection between a city and a see."—Stephen's "Com." i., p. 124. In America, the term is applied to all towns which are incorporated and governed by a mayor and aldermen. See BOROUGH.

In the case of towns which have grown greatly beyond their original dimensions, it is not unusual to give the name of C. to the space which they originally occupied —thus, we speak of the C. of London, the C. of Paris, of Vienna, &c.

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CITY OF REFUGE. The Jewish law (Numb. xxxv., Duet. iv., Josh. xx.) set apart six cities, three on each side of Jordan, as cities of refuge for the manslayer, in which he might find an asylum, and be safe from the avenger of blood. See BLOOD, AVENGER OF. These cities were Hebron, Shechem, and Kadesh-Naphtali on the west of Jordan; Bezer, Ramoth-Gilead, and Golan, on the east. The Jews were careful to keep the roads to the cities of refuge clear, and signs were set up to shew the way. The manslayer was received and protected in the C. of R. until the death of the high-priest, after which the avenger of blood had no longer any claim against him. Thus this peculiar institution was connected with the typical institutions of the Jewish religion, and partook somewhat of their character, whilst it modified and restrained the avenging of blood. The C. of R. afforded no permanent protection to the murderer, who, if his crime could be proved against him, was to be taken from it that he might be put to death.

CIUDA'D (from the lat *civitas*) is the Spanish word for "a city;" and is used as a prefix corresponding to the English affix *town*, as in

CIUDAD BOLIVAR. See ANGOSTURA.

CIUDAD REA'L, a town of Spain, capital of the province of the same name, situated on a plain between the rivers Guadiana and Jabalon, about 100 miles south of Madrid. It is surrounded with walls in parts ruinous, and has some handsome houses; but, on the whole, it is a poor dull place. It has two or three fine churches —the nave of the parish church being one of the finest Gothic specimens of the kind in Spain—and several monasteries. There are manufactures to a small extent of coarse woollens, linen, and table-cloths, and a trade in the agricultural produce of the district. Pop. 10,500.

CIUDAD RODRI'GO (Roderic's Town), a fortified town of Spain in the province of Salamanca, about 50 miles southwest of the city of that name. It is situated on an elevation above the river Agueda, which washes the walls, and is here crossed by a fine bridge. It has a cathedral, the earliest portion of which dates from the 12th century. The town generally has a mean appearance, and is not over-cleanly. During the Peninsular War, C. R., though of little strength itself, was considered a place of the utmost importance, as a key of Spain on the west, and was consequently an object of ambition both to the French and the allies. In June 1810, the French under Massena invested the town, and after a gallant defence by the Spaniards, it was forced to surrender on the 10th July. The fact that Wellington was in the immediate vicinity with an army of 30,000 men, and afforded no relief whatever, was a subject for outcry against the hero; but subsequent events at Torres Vedras shewed that his policy was the right one. In January 1812, after a siege of 11 days, the place was assaulted, and after a bloody struggle the British succeeded in capturing the town. The storming is one of the most brilliant achievements recorded in British military annals, and important as it was brilliant; 150 guns fell into the hands of the captors, besides vast stores of every kind, and the moral effect was even more than proportionately great. Pop. 4850.

CIUDADE'LA, a seaport town of the island of Minorca, situated on a plain on the west coast, in lat. 39° 58′ n., long. 3° 52′ e. It is walled, and has a cathedral, also several convents. The inhabitants, numbering between 7000 and 8000, are engaged in agriculture and the manufacture of woollen fabrics. A considerable trade is carried on at the port.

CI'VET (*Viverra*), a genus of carnivorous quadrupeds, of the family *Viverridæ* (q. v.), having the body elongated, in some of the species as much as in the weasel tribe; the head is also long, and the muzzle sharp. The ears are short, broad, and rounded. The feet have five toes, and the claws are only semi-retractile. There is a more or less conspicuous erectile mane along the back, as in hyænas. Between the anus and the sexual organs, in both male and female, there is a large double pouch, in which is secreted a peculiar odoriferous fatty substance, called *Civet*, much used as a perfume. The use of this pouch and its secretion to the animal is not very well known. There are several species of C., of which the best known is the common or African C. (*V. civetta*), a native of the north of Africa. The common C. is from two to three feet long. The height is from ten inches to a foot; the hair long, brownish gray, with numerous black bands and spots. The C. preys on birds, small

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quadrupeds, and reptiles, and generally takes its prey by surprise. It is very commonly kept in confinement for the sake of its perfume, which is removed from the bag about twice a week by means of a small spatula, and is obtained most abundandly from the male, and especially after he has been irritated. A dram is a large quantity to obtain at a time. The civets kept for this purpose are fed on raw flesh; the young partly on farinaceous food. The town ot Enfras, in Abyssinia, is a principal seat of the C. trade, and great numbers are there kept.

CIVIDA'LÉ, a walled town of Venetia, Northern Italy, abont 10 miles east northeast of Udine, situated on the Natisone, which is here crossed by a bridge. C. is the ancient *Forum Julii*, and its collegiate church, a fine Gothic edifice, dates from the 8th century. In its archives are contained some valuable manuscripts. It has silk and cotton factories, and a population of some 4500.

CI'VIL DEATH. Death, in a legal point of view, is either natural or civil: the former being the cessation both of physical life and of the legal rights which attach to it; the latter, the cessation of the legal rights whilst the physical life remains. "Civil death occurs where a man, by act of parliament or judgment of law is attainted of treason or felony; for immediately upon such attainder he loses (subject indeed to some exceptions) his civil rights and capacities, and becomes, as it were, *dead* in law. It also took place formerly where any man abjured the realm by the process of the common law; or entered into religion, that is, went into a monastery, and became there a monk professed; in which cases he was absolutely dead in law, and his next heir should have the estate. Even in the times of popery, the law of England took no cognizance of *profession* in any foreign country, because the fact could not be tried in our courts; and therefore, since the Reformation, this disability is held to be abolished; as also the disability of banishment, consequent upon abjuration, by stat. 21 Jac. I. c. 28." Stephen's "Com.," vol. i., pp. 142, 143.

CIVIL ESTAB'LISHMENTS, of the Army, comprise certain departments which, though provided for out of the Army Estimates, are non-military in their organisation; such as those connected with the manufacture of munitions of war.

CIVIL LAW. See LAW.

CIVIL LIST. Down to the period of the Restoration in 1660, notwithstanding an attempt at negotiation between James I. and the parliament for the commutation of the hereditary revenues of the crown, the whole expenses of the government of England, civil and military, were included in one list, or rather they were defrayed out of what was called the royal revenue. This revenue arose partly from crown-lands, and partly from other sources, and for a long period after the Conquest, it was really at the disposal of the crown. Even after the supplies were provided by parliament, the specific mode of their expenditure continued to be free from parliamentary control. But at the Restoration, a distinction was made (by statute 12 Charles II.) between the extraordinary expenses occasioned by war, and the ordinary cost of the civil establishments of the country. For the latter, the needful funds were provided, partly from such crown-lands as were still unalienated, and partly from taxes which parliament voted for the purpose at the commencement of each reign. These were called the hereditary or C. L. revenues. During the reign of William III., the C. L. amounted to £680,000 annually. The branches of expenditure included under this head were the following: 1. The royal household; 2. The privy purse; 3. The royal palaces; 4. The salaries of the chancellor, judges, great officers of state, and ambassadors; 5. The incomes given to the other members of the royal family; 6. The secret-service money, pensions, and other irregular claims. The support of the army and navy was now provided for by an annual vote of the House of Commons, and the interest of the national debt was never charged against the civil list. During Queen Anne's reign matters remained nearly on their former footing; but on the accession of George I., the C. L. was raised to £700,000 a year, and on that of George II., to £800,000. George III., notwithstanding that he had surrendered very large portions of the remaining hereditary revenue of England, accepted the last-mentioned sum. But it proved insufficient for the purpose. A large amount of debt was incurred, and in 1769 and 1777, parliament voted sums for his relief, amounting together to more than £1,000,000. In 1777, the C. L. revenue was raised to £900,000, but further deficien-

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cies to the extent of £370,000 had still to be supplied by extraordinary votes. In 1780, Mr. Burke succeeded in abolishing several useless offices, and reducing the expenditure. Notwithstanding these and other efforts in the same direction, it was found indispensable continually to augment the C. L. revenue. In 1804 it was raised to £960,000, and in 1812 to £1,080,000, besides annuities to members of the royal family, which were now paid out of the Consolidated Fund (q. v.) to the amount of £260,000. When George IV. succeeded to the throne, £255,000 of expenditure was transferred to other funds, and the C. L. was then fixed at £850,000 per annum. The crown enjoyed, in addition, the hereditary revenue of Scotland, amounting to about £110,000, and a separate C. L. was kept up for Ireland of £207,000. Against these large sums, however, were still placed many charges which belonged to the nation rather than the crown; and it was not till the 15th of November 1830 that Sir Henry Parnell, afterwards Lord Congelton, carried a motion for the appointment of a select committee for the purpose of separating the proper expenses of the crown from all other charges. The result of this measure was the act (1 Will. IV. c. 25) for the regulation of the civil list. The sum of £510,000 was now granted to his majesty, and exclusively devoted to the privy purse, the salaries and expenses of the household, secret-service money, and pensions. The separate list for Ireland was discontinued, and the Scotch hereditary revenues and other items were directed to be paid into the Exchequer. The change was rather a new distribution, which enabled the country to look more closely into its expenditure, than a real reduction of the civil list.

On the accession of Queen Victoria, the C. L., which had long been of the nature of a compact between the monarch and the parliament, and, as such beyond the control of parliament during the life of the sovereign, was settled by 1 and 2 Vict. c. 2. The Queen surrendered the hereditary revenues of the crown for life, in consideration of a yearly sum of £385,000, to be devoted solely to the support of her Majesty's household, and the honor and dignity of the crown. The application of this sum to the particular branches of the Queen's privy purse, the salaries and expenses of the household, the royal bounty, alms and special services, is intrusted to the Lords of the Treasury; and it is provided that if the C. L. charges in any one year shall exceed the total sum of £400,000, an account of the particulars of excess shall be laid before parliament in thirty days. Besides the above sum, £1200 a year is intrusted to her Majesty for the payment of pensions, "to persons who have just claims on the royal beneficence, or who, by their personal services to the crown, by the performance of duties to the public, or by their useful discoveries in science, and attainments in literature and the arts, have merited the gracious consideration of their sovereign and the gratitude of their country."

CIVIL SERVICE is a general name for all the duties rendered to and paid for by the state, other than those relating to naval and military matters. At the head of the British C. S., which numbers above 50,000 officials of all grades, are placed the officers of the Royal Household, under several departments. Then come the officers of the House of Lords and the House of Commons. Then a vast number of offices or departments, of which the following are the more important: Treasury, Home Office, Foreign Office, Colonial Office, India Office, War Office, Admiralty, Board of Trade, Post-office, Customs, Inland Revenue (including Stamps, Taxes, and Excise), Exchequer and Audit Office, Office of Woods and Forests, Office of Works and Buildings, Duchy of Lancaster, Public Record Office, Local Government Board, Education Department, Civil Service Commission, Registrar-general's Office, Stationery Office, Ecclesiastical Commission, Charity Commission, Patent Office, Emigration Office, Trinity House, Heralds' College, Law and Equity Courts, Ecclesiastical and Admiralty Courts, Prisons Department, British Museum, Science and Art Department, Diplomatic and Consular Corps. Several departments peculiar to Scotland and Ireland form distinct lists, not included in the above.

The heads of most of the departments are political officers, changing with the Ministry. Others, such as the head of the Exchequer and Audit Department, or the Commissioners of Customs and of Inland Revenue, are permanent officials. Excluding the judicial offices, and a few departments where special knowledge is required, the C. S. is open to the public generally, the principle of open competition being in force as regards most of the departments.

In former times appointments to the government offices were obtained mostly by

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favor; but now, merit and abilities are conditions superadded. By an Order in Council, dated May 21, 1855, the system was first placed on a new basis, and a commission was appointed to examine all candidates for the service. A candidate being *nominated*, the Commissioners in due time notified that he must come up to be examined, and produce certificates of birth, health, and character. The heads of the several departments agree with the Commissioners as to the extent and nature of the subjects on which candidates should be examined. The Commissioners neither nominate nor appoint; they only examine, and notify the result of the examination.

By an Order in Council, dated 4th June 1870, the regulations were altered, the rule of open and unrestricted competition being then introduced, qualified by some exceptions. In certain small and special offices, nomination with subsequent success at an examination remained the rule of entry. But for all the principal departments—the Foreign Office being the only prominent exception—there is open competition, to which all British subjects of the required age and of good health and character, are admissible. For offices of the superior grade, the age is from 18 to 24, and in the lower division, the age is from 17 to 20. Boy clerks must be over 15 and under 17. Any successful candidate remaining on the list without obtaining an appointment, is struck off at the age of 25. Boy clerks who at 19 fail to obtain appointments as man clerks are also struck off. The first open competition held was on 22d February 1871, when 30 situations in the Excise were competed for by a large number of candidates. A further change was made by the introduction of 'writers"—a species of "uncovenanted" clerks, who were paid by the hour, were dismissible at pleasure, and had no claim to pension. Writers were first introduced in August 1870, and "boy clerks" were sanctioned in July 1870.

These various changes (tending in the opinion of the service to lower the status of the officers) and the increased cost of living resulted in great agitation throughout the C. S., and in the appointment of a commission under Dr Lyon Playfair, to reconsider the whole system of C. S. organisation and pay. Following on reports from this commission, considerable changes were made. The decision that the lower grade should have no claim to rise above £200 a year, or to obtain promotion into the higher grade, and the introduction of "duty-pay" as a means of rewarding special responsibilities, may be named amongst the chief alterations. The Playfair commission reported against the employment of temporary writers; and that class of employees ceased to be appointed after the issue of the Order in Council of 12th February 1876, though a small class of temporary "copyists" is still maintained. The granting of pensions to the C. S. is now regulated by acts passed in 1859 and 1871, the latter allowing the commutation of pensions for a lump sum when these have been granted on abolition or reorganisation of office. The rate of pension is one-sixtieth of pay for each year's service.

The more important departments of the C. S. will be found briefly described under their proper headings in this work.

CIVIL SERVICE ESTIMATES include all expenses of the state not provided for in the Army and Navy Estimates. As an example of these C. S. E., we will quote the amounts voted under their various heads for the financial year beginning April 1, 1877, and ending March 31, 1878:

Public works and buildings	£1,402,904
Salaries and expenses of public departments	2,609,873
Law and justice	5,089,274
Education, science, and art	3,546,985
Colonial and consular services	550,280
Superannuation and retired allowances, and gratuities	548,318
Miscellaneous and special	28,614
	£13,726,198

CIVILIAN. This term has three meanings, which are distinct, though intimately related. 1. In a popular sense, it signifies a person whose pursuits are civil; i. e. neither military nor clerical. 2. As a law-term, it means either a person who is versed in the principles and rules in accordance with which civil rights may be freely, blamelessly, and successfully vindicated in society generally, or in the partic-

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ular state to which he belongs—or 3. One who has made a special study of these rules and principles as exhibited in the laws and government of Rome (the Roman civil law.) The civil law of Rome exercised such influence upon the formation of the municipal systems of almost all the states of modern Europe, that those who devoted themselves to its study were regarded as "civil" or municipal lawyers *par excellence*. From the more learned training which this study demanded, C. came often to be used as synonymous with professor or doctor, as opposed to practitioner of law; the former being generally more deeply versed in the Roman law than the latter; and this in its turn led to its being loosely applied to the international lawyers of the 17th c. (Grotius, Puffendorf, &c.), who generally belonged to the class of civilians in the sense of Romanists, and who, though their subject was altogether different, quoted largely and derived many analogies from the Roman jurisprudence. At present, from our having in Great Britain no class of persons who prosecute law as a *science* as opposed to an *art*, the term C. has reverted to its narrower medieval sense of student or teacher of the Roman civil law, and thus we speak of Savigny as a C., but not of Story. The special sense in which C. is understood in England will be explained under ECCLESIASTICAL COURTS. See also ADMIRALTY COURTS.

CIVILISA'TION. This is a general term to designate the condition of the more advanced nations, as contrasted with those that are looked upon as barbarians or savages. We term the leading nations of Europe civilised; the Chinese and Tartars less so: the Red Indians, Australians, Esquimaux least of all. "Whatever be the characteristics of what we call savage life, the contrary of these, or the qualities which society puts on as it throws off these, constitute civilisation. Thus, a savage tribe consists of a handful of individuals, wandering or thinly scattered over a vast tract of country; a dense population, therefore, dwelling in fixed habitations, and largely collected together in towns and villages, we term civilised. In savage communities, each person shifts for himself; except in war—and even then very imperfectly—we seldom see any joint operations carried on by the union of many; nor do savages, in general, find much pleasure in each other's society. Whenever, therefore, we find human beings acting together for common purposes in large bodies, and enjoying the pleasures of social intercourse, we term them civilised." And so of other characteristics. "Dissertation" by J. S. Mill, art. "Civilisation."

When we come to seek for an exact definition of the term C., we meet with a variety of views, implying that there is a certain complication in the subject. The original derivation of the word points to that polish of manners that distinguishes the inhabitants of cities (Lat. *cives*) from the rustic population; but the use of the word has greatly outgrown this limitation. Guizot has given a definition, which has become generally known, to the effect that we are to include in C. the improvement of man both socially and in his individual capacity. But the chief difficulty lies in settling what is *improvement*. That people are far from agreed on this point is evident from the use of the phrase, "vices of civilization." How are we to distinguish its vices from its virtues?

The question is very much simplified by making a distinction between *aiming at* the improvement of mankind and really *effecting* that object. All our inventions and discoveries, and all our new arrangements introduced into every department of life, are intended to raise us further and further above the savage condition; nobody denies this; but there may be the widest difference of opinion as to whether any one new device is a real improvement. If we were to restrict the term C. to the changes introduced into human life *with a view* to improvement, the definition of it would present no difficulty; whereas the relation of this to *progress*, or actual improvement, must ever remain open to difference of opinion.

Leaving out of view for the present the disputable matter, C. may be explained as follows: In the first place, there are certain things bearing decidedly on human preservation and human happiness that are to be excluded from the definition. C. is *not* natural advantages—such as those of soil and climate; or the goodness of the mental or bodily constitution of the race; or accidents of fortune favoring our exertions; or individual dexterity or skill than cannot be imparted. It is not necessarily happiness, which is sometimes present in a low C. and absent in a high. "The permanent changes in the condition and arrangements of man's life effected by his own intelligence and exertions" make up human civilisation. It is the *artificial* half of the good we enjoy. Nature has given us so much; our own powers of contrivance

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give the rest. Genius (in the sense of intellectual originality) is the cause, and C. the effect.

Such being the general definition, the enumeration of the separate departments is the enumeration of the institutions of civilised life. These may be briefly summed up under the following heads:

1. The *Industrial Arts*, or the devices fallen upon for turning to advantage the material resources and agencies of the globe. Perhaps no one will be found to dispute that these constitute real improvements.

2. The *Government*, or system of political organisation. It is here that we are most forcibly convinced of the propriety of distinguishing C. from *absolute progress*, or the devices intended for improvement from actual improvement. Scarcely anything in the whole political system of Great Britain, for instance, has commanded unanimous approbation first and last; nearly all the changes have been carried against reluctant minorities, and every now and then voices are raised against institutions accounted by the mass of the nation the very bulwark of our national greatness; as, for example, the parliamentary control of the sovereign authority.

One aim of social reformers has been to make the necessary functions of government compatible with a larger and larger range of individual liberty. The majority of men call this state of things not merely an intended but a real improvement; not merely C., but progress. Still, there is never wanting a class of minds that see only the disadvantageous side of this and all other social innovations.

Connected with liberty, we may also notice the growth of humane sentiment in all classes, the governing power included. When we revert to the horrible punishments to which men were subjected in this country, not many generations since, not only for real crimes, but out of mere superstitious antipathies, as in the burning of witches, we are apt to feel ashamed of our own ancestors, and to congratulate ourselves on having our lot cast in a milder age.

3. The *Arts of Social Intercourse*, embracing the material machinery of conveyance and communication; and also what may be called the moral machinery, such as forms of procedure for regulating assemblies, and the minor courtesies of life.

4. The scheme of *Morality* established in a community appertains to their civilisation. But in this also, difference of opinion prevails, when we compare different countries and times. Morality, in fact, has always been more or less a part of *Religion*, which must also be viewed as an institution pertaining to civilised men, whether of their own invention or the result of supernatural communication. In any case, there is mixed up with every religion much that is purely human, and which may be judged of by its tendencies to promote human welfare, like any other arrangement of society. This being the subject of all others that men have most differed upon, no criterion of progress can be laid down, because none would be universally received. The unconverted pagans alive at the final establishment of Christianity, naturally believed that the human mind was thrown backward by that event.

5. *Science* is the least disputed of all the ingredients of civilisation.

6. *Literature* and the *Fine Arts* make part of the C. of mankind. They are a new class of pleasures, superadded to the gratifications of mere sense, and of a kind that can be partaken equally by a large number of people. Instead of rivalry and contention, which are inseparable from the struggle for food, money, or power, the Arts tend to sociability and good-fellowship. Every contribution to Architecture, Painting, Music, &c., is a result of human genius and intended for human pleasure; but there is not the same unanimity in this case as in the former; for many kinds of art are objected to as corrupting the mind; and too great a devotion to Art, on the whole, is said to endanger the just balance of men's regards to the serious interests of life.

The above enumeration will amply shew how to define the term C., and of what parts the total is made up. It has also been made apparent that the point as to whether any invention be an item of genuine *progress*, is, and ought always to be, an open question. The inventions of original minds intended for placing us further and further from the savage condition, and having that effect, may often be accused of producing new evils, which other arrangements are called for to neutralise. See "Chambers's Papers for the People," No. 4, "Education of the Citizen."

CI'VITA CASTELLA'NA, a town of Central Italy, about 30 miles north-east of

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Rome. It is a place of 4000 inhabitants, picturesquely situated on a plateau of volcanic tufa above the Rio Maggiore; has an old cathedral, and a citadel, now used as a prison. It is, however, chiefly remarkable on account of the vast number of Etruscan remains. It occupies the site of the ancient *Falerium Vetus*, one of the 12 cities of the Etruscan League; and *Falerii Novi*, of which also there are many remains, stood about 4 miles to the north of Civita Castellana.

CIVITA DI PE'NNÉ a town of South Italy, in the province of Teramo, situated on a commanding hill about 20 miles south-east of Teramo. It is an ancient place, having, under the name of *Pinna*, been the chief city of the Vestini; and some remains are still found here. The modern town, though containing some fine edifices, including the cathedral, is in general badly built. C. di P. is noted for its manufactory of silk-flowers. Pop. 9800.

CIVITANO'VA, a town of Central Italy, province of Macerata, 12 miles west of the town of Macerata. Population, including the port, 8583. It stands not far from the Adriatic, and has a fine harbor, much frequented. Its lands produce vines, olives, and pasturage. It is an industrial and commercial city.

CIVITA SAN-A'NGELO, a town of South Italy, in the province of Teramo, situated near the Adriatic, about 25 miles south-east of Teramo. It has a population of 6000, and an active trade.

CIVITA VE'CCHIA, an Italian city in the province of Rome, is situated on the Mediterranean, in lat. 42° 4′ n., long. 11° 45′ e. Its ancient name was *Centum Cellæ*. The harbor of C. V. is one of the best in Italy, and was constructed by the Emperor Trajan; the town, indeed, owed its origin entirely to the port of this emperor, and hence it was also known as Portus Trajani. The harbor is formed by two artificial moles projecting into the sea, while a third constructed between the two serves to protect the harbor from the heavy sea; upon this third and outward mole there is a good lighthouse, some 80 feet above the level of the sea. Within the port there is a small dock and an arsenal. The town of C. V. is small, and has no buildings of any note except a large church in the principal street. The streets are ill paved and narrow, and the inhabitants poor. Pop. about 10,500. It is a free port, and is regularly visited by steam-packets from Marseille, Leghorn, Naples, Genoa, Messina, and Malta; while the majority of travellers visiting Rome land here. It is famous among the modern Italians for its oysters, which are extremely small, but delicious to the taste.

CIVITE'LLA DEL TRO'NTO, a town of South Italy, in the province of Teramo, ten miles north of Teramo. It is situated on a rock, is fortified and defended by a strong castle. C. del T. is historically interesting as the place where, in 1053, Robert Guiscard and his Normans gained a complete victory over the forces of Pope Leo IX., and the Emperor Henry III. of Germany; and also for the siege it sustained in 1557 against the French and papal army under the Duke of Guise, who was finally forced to retreat.

CLACKMA'NNAN, the county town of Clackmannanshire, in the south part of the county, on the Devon, near its confluence with the Forth, 9 miles east of Stirling. It lies on ground rising 190 feet above the rich carse-land of the plain of the Forth, which is also rich in coal, iron, and limestone. C. was formerly a royal burgh, and is mentioned as such in the acts of parliament of James V. in 1540 and 1543. From a bull of Pope Celestine III., dated 1195, it appears that at this early date the church and its chapels, together with forty acres of land, belonged to the Abbey of Cambuskenneth. In 1380, King David Bruce resided at Clackmannan. In 1358—1359, King David II. confirmed to Sir Robert de Bruce the castle and barony of C., with the lands of Kennet and others; and from that period to the present, the Bruces have been proprietors in this parish. Pop. (1871) 4653.

CLACKMA'NNANSHIRE, the smallest county of Scotland, bounded n. and w. by Perthshire and the Ochil Hills; e. by Perthshire and Fifeshire; s. by the Forth, separating it from Stirlingshire. Its greatest dimensions is 10 by 8 miles; area, 48 square miles. Pop. (1871) 23,747. It chiefly consists of the valley of the North Devon, gently declining from the green Ochil Hills to the Forth. The Ochils consist of trap, especially amygdaloid, claystone, porphyry, and greenstone, and rise in Bencleugh (more properly, Benclach), 2352 feet, and Dunmyat, or Demyat, 1345. A

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ridge of high ground, with inferior soil, often resting on clay, runs west through the middle of C., between the very fertile alluvial lands resting on the coal-measures in the south, and the North Devon valley in the north, where the soil is loamy, and rests on gravel, and also on the coal-measures, which extend to the base of the Ochils. The chief minerals are ironstone, sandstone, greenstone, coal, limestone, silver, copper, antimony. The chief rivers are the North Devon, rising in the south of Perthshire, and the Black Devon, rising in the south-west of Fifeshire; both run west across C. into the Forth. The river Forth is navigable for vessels of 500 tons up to Alloa, at which port ships of 700 tons register have been built. The chief crops are wheat, barley, and oats. The number of acres in C., under all kinds of crops, bare fallow, and grass, in 1876, was 15,884; under corn crops, 5849; under green crops, 1535; clover, sanfoin, and grasses in rotation, 3279; permanent pasture and meadow land, 4914. The "Hillfoots" have long been celebrated for their woollen manufactures, chiefly in tartan shawls and plaids, and have become favorably known in the production of tweeds. The district is likewise famed for its ale, there being seven breweries in the county. There are also extensive distilleries. There are manufactures of green glass bottles, earthenware, bricks and tiles, also timber trade and ship-building. The chief exports are iron and coal. The columnar greenstone of Abbey Craig, near Stirling, has come into use for grinding flour, which it does nearly as well as the French burr-stones. C. contains four parishes. The chief towns are Clackmannan, the county-town; Alloa, the most important place; and Dollar, noted for its endowed educational establishment. C., with Kinross-shire, returns one member to parliament; but the county occupies the anomalous position of having parishes within its circumference politically—Alva in Stirlingshire, and Tullialian and Culross in Perthshire—which it does not embrace judicially. In C. have been found Roman stone coffins, sepulchral vases, and old Roman coins. The Marquis of Montrose, in 1645, burned Castle Campbell, now a noble ruin situated on a wild but easily accessible eminence, on the brow of a hill immediately behind Dollar. In C., George Meikle constructed, 1787, the first effective thrashing-machine in Scotland.

CLA'DIUM (*Gr. Clados*, a branch or twig), a genus of plants of the natural order *Cyperaceæ*, of which one species, *C. Mariscus*, is a native of Britain, particularly common in the bogs and fens of Cambridgeshire, where hundreds of acres are almost entirely covered with it. It is 3—5 feet high, with a rounded leafy stem, the keel and margins of the leaves rough and almost prickly. It is consequently hurtful to cattle. It is used for thatching, and in Cambridgeshire also for lighting fires. The English name Twig-rush has been given to it, but is only of recent invention.

CLAIM, in English Law, is a challenge of interest in anything that is in the possession of another, or at least out of a man's own possession. Claims are either verbal or by action, and relate either to lands or to goods and chattels; their object being generally to preserve a title which otherwise would be in danger of being lost.

CLAIM OF LIBERTY is a suit or petition to the Queen in the Court of Exchequer, to have liberties and franchises confirmed there by the attorney-general (Tomlins' "Law Dic.").

CLAIR, St, a river of North America, being that part of the St. Lawrence, in its largest sense, which carries into Lake St. Clair the waters of Lake Huron. It is 30 miles long, and half a mile broad, and easily navigable, its depth being 60 feet. Lake St. Clair measures 30 miles in length by 12 in average width, and communicates at its southwest end with Lake Erie by means of the Detroit.

CLAIRAC, a town of France, in the department of Lot-et-Garonne, situated on the Lot, about 16 miles north-west of Agen. It has flour and paper mills, and a considerable trade. C. is chiefly interesting, however, as the first place in the south of France that embraced the doctrines of the Reformation, which it did in 1527, on the example of its abbot, Gerard Rouselle. It was the scene of frequent contests between Roman Catholics and Huguenots. Pop. (1872) 2423.

CLAIRAUT, Alexis Claude, an eminent French mathematician, was born at Paris May 7, 1713. He early exhibited a most remarkable aptitude for mathematics, and was considered worthy of admission to the Academy of Sciences, while as yet

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he was only 18 years of age. C. wrote a great number of scientific papers, but his fame now rests principally upon his "Figure of the Earth," in which he promulgated the theorem, that the variation of gravity on the surface of the earth, regarded as an elliptic spheroid, was altogether independent of the law of density, the opposite opinion having been previously held; on his explanation of the motion of the lunar apogee, a point left unexplained by Newton; and on his computation of the time of the return of Halley's comet. He died at Paris, May 17, 1765.

CLAIRE, St, or *Santa Clara*, was born in 1193, of a rich and noble family of Assisi, in the duchy of Spoletto. Attracted by the eloquence and piety of St. Francis of Assisi, she abandoned the pleasures of social life, in which she had previously indulged, and betook herself to solitude, prayer, and mystic meditation. Her imagination, excited by religious emotions, deceived her into the belief that she was in more direct communication with God than her fellow-mortals; and taking her own desires for divine intimations, she founded an order of nuns in 1212, and after obtaining a great reputation for sanctity, died at Assisi, August 11, 1253. Two years afterwards, she was canonised by Alexander IV.

CLAIRE, St, Nuns of the Order of, a religious order founded by St. Claire, with the counsel and help of St. Francis of Assisi, in 1212. At first, the nuns observed the rule of St. Benedict, but in 1224 the austerity of this rule was mitigated by St Francis, and again modified by Urban IV. in 1264. Those who follow the rule as modified by Urban, are called *Urbanists;* the other and austerer portion of the sisterhood, *Damianists.* The order rapidly increased; and convents are numerous to the present day in Italy, France, Belgium, Bavaria, Asia, and America. The nuns devote themselves chiefly to the education of the young.

CLAIRVAUX, a village in the department of Aube, about ten miles above Bar-sur-Aube, on the left bank of the river, is remarkable as the site of the once famous Cistercian Abbey (Clara Vallis), founded in 1114 by St Bernard, who presided over it till his death in 1153, when he was buried in the church. Besides the original buildings, a new and splendid convent was afterwards erected, and a church which was reckoned a masterpiece of architecture, but was destroyed at the Restoration. There was shewn in the convent a monster cask, called "St Bernard," which contained 800 tuns. The abbey, which had at one time a revenue of 120,000 livres, was suppressed at the Revolution, and the extensive buildings are now used as a workhouse and house of correction.

CLAIRVOY'ANCE. See SOMNAMBULISM.

CLAM. See CHAMA.

CLAM, in Heraldry, is a term for an escalop or cockleshell, and is supposed to indicate that the bearer has been a crusader, or has made long voyages by sea.

CLAM, Bear's Paw (*Hippopus maculatus*), a bivalve mollusk of the South Seas of the family *Tridacnidæ*. The shell is described as "perhaps the most beautiful of bivalves, whether in regard to form, texture, or color." It is therefore a favorite shell for ornamental purposes. It is transversely ovate, ventricose, ribbed, roughened with scaly inequalities, white, and spotted with red or purple.

CLAN (Gael. *clann*, Manx *cloan*, meaning "children," i. e., descendants of a common ancestor). This word became incorporated with the English language at least as early as the 17th c., to mean a body of men confederated together by common ancestry or any other tie, and in this sense it is used both by Milton and Dryden. It came to be applied almost exclusively to the several communities of the Scottish Highlanders, as divided from each other topographically and by distinctive surnames. The word has sometimes been applied to those great Irish septs which at one time were a sort of separate states; but these, with their characteristic forms of internal government, were completely broken down by the power of the English predominance, before the word came into familiar use in the English language. In Scotland, it was used in the 16th c. to designate to freebooters of the border as well as to the Celtic tribes of the Highlands; and there were two characteristics common to both—their predatory habits, and their distribution into communities, each with a common surname. In the act of the Scottish parliament of 1587, for instance, which requires landlords to find security for the conduct of their tenants, it is pro-

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vided that those "who have their lands lying in far highlands or borders, they making residence themselves in the inlands, and their tenants and inhabitants of their lands being of clans, or dependars on chieftains or the captains of the clans, whom the landlords are noways able to command, but only get their mails (or rents) of them, and no other service or obedience, shall noways be subject to this act but in manner following." Then follow provisions for enforcing the law directly on the chieftains or captains of those clans residing in territories where the owner of the soil—generally the merely nominal owner, in terms of some useless charter—had no control. It was always the policy of the old law of Scotland to require all the Highland clans to have some respectable representative—a man of rank and substance, if possible—who should be security at court for their good conduct. Clans that could find no security were called "broken clans," and their members were outlaws, who might be hunted down like wild beasts. The Macgregors were a celebrated broken C., whom the law pursued for centuries with savage ingenuity. Among other inflictions, their name was proscribed, and such members of the C. as endeavored to live by peaceful industry in the Lowlands, adopted derivations from it; hence we have the names of Gregor, Gregory, and Gregorson or Grierson. The clans are never treated in the old Scots acts with any respect, or otherwise than as nests of thieves and cut-throats. The following passage in the act of 1681 (c. 112) which virtually authorises any Lowlander, injured by any member of a C., to take vengeance against all or any of his clansmen, contains a picturesque, though, for a legislative enactment, certainly a very highly colored account of the social condition of the Highland clans in the 16th century. "The said clans of thieves for the most part are companies of wicked men, coupled in wickedness by occasion of their surnames, or near dwellings together, or through keeping society in theft or receipt of theft, not subjected to the ordinar course of justice, nor to any ane landlord that will make them answerable to the laws, but commonly dwelling on sundry men's lands against the good-will of their landlords, wherethrough true men oppressed by them can have no remeid at the hands of their masters, but for their defence are oftentimes constrained to seek redress of their skaiths of the hail clan, or such of them as they happen to apprehend. Likewise the hail clan commonly bears feud for the hurt received by any member thereof, whether by execution of laws, or order of justice, or otherwise." The Highland clans are often carelessly spoken of as a feudal institution, but in reality their distinctive character cannot be better understood than by keeping in view some peculiarities which set them in complete contrast with the feudal institutions of Britain. All feudality has a relation to land, from the serf bound to the soil through the free vassal who possesses it, up to the superior or feudal lord, who commands services out of it. The descent to all rights connected with it is hereditary. Among the Highlanders, on the other hand, the relation was patriarchal, and had no connection with the land, save as the common dwelling-place of the tribe. It often happened, as the acts above quoted explain, that the head of a C. and the owner, according to feudal law, of the estates occupied by it, were two different persons. Clans did not acknowledge the purely feudal hereditary principle, and would elevate to the chiefship a brother or an uncle, in preference to the son of a deceased chief. It is a curious illustration of this, that in the rebellion of 1715, the notorious Lord Lovat, who had just returned from France, being acknowledged by the C. Fraser as their chief, drew them away from the rebel army, to which the proprietor of the Fraser estates had endeavored to attach them, and arrayed them on the government side.

CLAN MACDU'FF, Law of, was a privilege of immunity for homicide anciently enjoyed by those who could claim kindred with Macduff, Earl of Fife, within the ninth degree. Macduff's cross stood on the march or boundary between Fife and Strathearn, above Newburgh; and any homicide possessed of the right of clanship who could reach it, and who gave nine kye (cows) and a colpindash (or young cow), was free of the slaughter committed by him. (Bell's "Dictionary.")

CLANDE'STINE MA'RRIAGE. A marriage contracted without the due observance of ecclesiastical ceremonies, even where concealment was not the chief or only object of the parties, is generally called a clandestine marriage. But, in Scotland, a distinction is made between marriages which are clandestine, and those which are simply irregular. All marriages which are not celebrated by a clergyman

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after proclamation of bans are irregular, and such of these irregular marriages as are entered into before a person professing to act as a religious celebrator, without being a minister of religion, are clandestine, and expose the parties, the celebrator, and witnesses to certain penalties. These penalties may be recovered before justices of the peace, on complaint by the fiscal; and the proceeding is not without some advantage to the parties, as the conviction is received as evidence of the marriage. In the eye of the law, clandestine and irregular marriages in Scotland are as valid as those in the face of the church, provided they be of such a kind as to establish the consent of the parties to become man and wife in point of fact. But, notwithstanding the existence of this rule of the civil law, marriages in Scotland, in any other form than *in facie ecclesiæ*, are practically of very rare occurrence. Persons convicted before a magistrate of an irregular marriage are required to register such marriage, and the magistrate is bound to give notice of the conviction to the registrar; and if the irregular marriage is established in a competent court, the clerk of court is to give notice (17 and 18 Vict. c. 80). To put a stop to Englishmen crossing the Border, merely in order to celebrate irregular marriages, it was enacted by 19 and 20 Vict. c. 96, 'that after the 31st December 1856, no irregular marriage shall be valid in Scotland, unless one of the parties has lived in Scotland for the 21 days next preceding the marriage, or has his or her usual residence there at the time." It is further enacted, that the parties to such a marriage may apply within three months, *jointly*, to the sheriff or sheriff-substitute of the country, for a warrant to register it. Upon proof that one of them had lived for 21 days, or usually resided in Scotland, and that they have contracted marriage, the sheriff is to grant a warrant to the registrar of the parish to record the marriage. A certified copy of the entry, signed by the registrar, which he must give for 5s., is declared to be evidence of a valid marriage.

CLANDESTINE MORTGAGE, in England, is a second mortgage of lands, already mortgaged for a valuable consideration, the first mortgage being concealed, or not discovered in writing to the second mortgagee. It is provided by 4 and 5 Will. and Mary, c. 16, that in such circumstances the mortgager, or person so mortgaging his lands, shall have no relief, or equity of redemption, against the second mortgagee.

CLA'P-NET, a kind of ground-net much used by the bird-catchers of the south of England, who supply the London market. It consists of two equal parts or sides, each about twelve yards long, by two yards and a half wide, and each having a slight frame. These are placed parallel to one another, fully four yards apart, and by an ingenious contrivance, the pulling of a string is made to close them upon one another, so as to cover the oblong space between them. Call-birds, either in small cages, or fixed by braces, are placed about the net to decoy wild birds to the spot.

CLA'PPERTON, Hugh, one of those British travellers that led the way in exploring the interior of Africa, was born at Annan, in the county of Dumfries, Scotland, in 1788. At the age of 17, he went to sea; and being impressed into a man-of-war, he distinguished himself by his services, and was appointed to the rank of lieutenant. In 1817, he returned to England on half-pay. Having become acquainted in Edinburgh with Dr Oudney, who was about to proceed to Bornu as British consul, the thoughts of C. were directed to Africa; and government appointed him and Lieutenant Denham to accompany Oudney in an exploring expedition into the interior of that continent. After a short stay at Tripoli, they started in February 1822 for Bornu, where Denham separated from his companions, in order to carry his researches southward. C. proceeded westward, accompanied by Oudney, who died by the way. He still pushed on alone as far as Sakkatu, but not being allowed to proceed further westward, he retraced his steps, and, in company with Denham, returned to England in 1825. The journey had done much for the knowledge of Africa, but the great geographical problem of the course of the Niger was still much in the same position. To solve it, if possible, C.—the rank of commander having been conferred upon him—started again in August 1825, in company with Captain Pearce, R.N., Mr Dickson, and Dr. Morrison. He had also Richard Lander as his confidential servant. They commenced their exploration into the interior from the Bight of Benin. His companions died early on the journey but C. and his faithful attendant Lander reached Sakkatu. Detained here by the Sultan Bello, the vexation joined to the hardships of the journey so affected his

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health, that he died at Changary, near Sakkatu, April 13, 1827. C. was the first European that penetrated from the Bight of Benin into the interior of Africa, and followed the course of the Niger for a great way. Though without scientific education, he was an intelligent and unprejudiced observer, and made important additions to geographical knowledge.—"Narrative of Travels and Discoveries in Northern and Central Africa in the years 1822, 1823, and 1824, by Denham, Clapperton, and Oudney" (Lond. 1826); "Journal of a Second Expedition into the Interior of Africa," &c. (Lond. 1829); "Records of Clapperton's Last Expedition to Africa," by Richard Lander (Lond. 1830).

CLAQUE (from Fr. *claquer*, "to clap the hands," or "applaud") is the name given to a contrivance for securing the success of a public performance or production, by bestowing upon it preconcerted applause, and thus giving the public, who are not in the secret, a false notion of the impression it has made. This artifice came first into operation in theatres and concert-rooms, and arose from friendly or party motives; but it is to be feared that it has spread into other departments of public life, not excepting even parliaments.

It was in Paris that it was first regularly organised and turned into a trade. One Sauton, in 1820, established an Office for the Insurance of Dramatic Success (Assurance des Succès Dramatiques), and was thus the organiser of the Parisian "claque." The directors or managers of a theatre send an order to the Office for whatever number of "claqueurs" they think necessary. If the success of a piece seems doubtful, as many sometimes as from 300 to 500 of these people are furnished with gratis tickets, and are often instructed at the rehearsals at what particular places they are specially to applaud. How minutely the art is organised, may be seen from the exact division of functions among the several claqueurs. The "commissar" is bound to learn the play by heart, and call the attention of the audience about him to the various beauties of the piece; the "rieur" must laugh at every jest; the "pleureur" (weeper) has to manifest his sensibility at the moving passages. This last part is generally assigned to women, in whom the frequent use of the handkerchief seems most natural. The "chatouilleur" (tickler), on the other hand, endeavors, by distributing bonbons, snuff, theatre-bills, &c., and by lively conversation, to keep his neighbors in good-humor; and lastly, the "bisseur" calls *encore!* with the utmost enthusiasm, at the conclusion of the specified pieces of music.

The following incident, which found its way into the newspapers on the occasion of the death of the famous French actress, Mademoiselle Rachel, shows the ludicrous seriousness with which the members of the C. view their singular profession: Mademoiselle Rachel had just created a new character in a modern piece, and during the first evening was loudly applauded. The next, however, she thought her reception by no means so warm, and she complained of it, adding that the C. did not do its duty. It turned out that the head of the C. had been ill, and that his place that evening had been supplied by a confrère from another theatre. This individual, on hearing of the complaint that had been made, wrote to mademoiselle as follows: "MADEMOISELLE—I cannot remain under the obloquy of a reproach from such lips as yours! The following is an authentic statement of what really took place. At the first representation, I led the attack in person not less than thirty-three times. We had three acclamations, four hilarities, two thrilling movements, four renewals of applause, and two indefinite explosions. In fact, to such an extent did we carry our applause, that the occupants of the stalls were scandalised, and cried out '*A la porte!*' My men were positively extenuated with fatigue, and even intimated to me that they could not again go through such an evening. Seeing such to be the case, I applied for the manuscript, and after having profoundly studied the piece, I was obliged to make up my mind for the second representation to certain curtailments in the service of my men. I, however, applied them only to MM. ——, and if the *ad interim* office I hold affords me the opportunity, I will make them ample amends. In such a situation as that which I have just depicted, I have only to request you to believe firmly in my profound admiration and respectful zeal; and I venture to entreat you to have some consideration for the difficulties which environ me."

The allegation that in London theatrical artists and managers are obliged to endeavor to insure success by means of a similar institution, is strenuously denied. Although no public offices of the kind have yet been established in Germany, the

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artifice is extensively practised, to the perversion of the public judgment and the detriment of art.

CLARE, a maritime county in the province of Munster, Ireland, bounded n. by Galway and Galway Bay; e. and s. by the Shannon, and its expansion, Lough Derg, separating it from Tipperary, Limerick, and Kerry; w. by the Atlantic. It lies between lat. 52° 32′ and 53° 7′ n., and long. 8° 2′ and 9° 58′ w. It is seventh in size of the Irish counties; length, 67 miles; greatest breadth, 38; average, 21, area, 1294 square miles—more than a half being arable, and a hundredth in wood. The surface is mostly hilly, with some mountains, bog, marsh, and rugged pasture. There is an undulating plain in the centre, from north to south. On the east lie the Inchiquin, Slieve Baughta, and Slieve Barnagh mountains, the highest being 1758 feet, with rich pastures between. The mountains on the west rise in Mount Callan to 1282 feet. In the south, along the rivers, are rich loamy pastures called corcasses. The coast-line is 140 miles along the sea, and 80 along the Shannon estuary. The sea-line is high and rocky, in parts precipitous, with many isles and fantastic detached rocks. For five miles at Moher, the coast rises 400 feet nearly perpendicular, and at another point 587 feet. The chief rivers are the Shannon (q. v.), and the Fergus, running south 27 miles through the middle plain, and by an estuary five miles broad. The county has about 100 small lakes. Carboniferous limestone is a prevailing formation in the county. The southwest third of the county forms part of the Munster coal-field, with beds of ironstone, and thin seams of coal and culm. C. has mines of lead, copper pyrites and manganese; slate and flag quarries; a black marble quarry near Ennis; and many chalybeate springs. The soils are warm and friable on limestone, deep rich loam on the Shannon, and cold and wet, with bogs and much timber on the coal tracts. Part of the limestone district is flooded in winter, but affords rich pasture in the summer, when the water dries up. In some places, spring-water is very scarce, and water can only be procured from the neighboring corcasses. The climate is moist and mild, but with frequent violent gales from the Atlantic. In 1875, 147,754 acres were under crops, the chief crops being oats, potatoes, wheat, barley, and turnips. The chief trade is in grain and provisions. Fine sheep and cattle are reared on the pastures. Fish are caught on the rivers in the native wicker-boats. The chief manufactures are course linens, hosiery, flannels, and friezes. C. is divided into 11 baronies, 80 parishes, and 7 poor-law unions, with parts of 3 others. The chief towns are Ennis (the county town), Kilrush, Ennistymon, and Killaloe. Pop. in 1841, 286,394; in 1851, 212,428; in 1871, 147,864, of whom 144,440 were Roman Catholics, 3027 Protestant Episcopalians, 220 Presbyterians, and the rest of other denominations. In 1875, C. had 31,234 pupils on the rolls of the National Schools. It returns three members to parliament, two for the county, and one for Ennis. C. has many cromlechs, raths, remains of abbeys, and old castles or towers, and several round towers, one at Kilrush being 120 feet high. C., till the time of Elizabeth, was called Thomond. An adventurer called Clare gave it its present name.

CLARE COLLEGE, Cambridge, founded 1326, under the name of University Hall, by Richard Badew, was burned in 1338 and rebuilt and endowed by Elizabeth, Countess of Clare. Chaucer calls this college "Solere" Hall. It has a master, 8 senior, and 10 junior fellows. The 18 fellowships are open to gentlemen of the degree B.A. or a higher, without restriction as to marriage. The master is elected by the senior and junior fellows. The buildings, which are in the Renaissance style, are amongst the most pleasing in the university. Richard III., pretending himself to be descended from the foundress, claimed the patronage of this Hall. The chapel was built in 1535, previous to which an aisle of St. Edward's Church, where the masters and fellows were anciently interred, was used for the purpose.

CLARE ISLAND, an island of Ireland belonging to the county of Mayo, situated in the Atlantic at the entrance of Clew Bay. It has a length of 4½ miles, with a breadth of 2 miles. On its north-east extremity there is a lighthouse at an elevation of 457 feet above the sea. Lat. 53° 49′ 30″ n., long. 9° 55′ 30″ w.

CLAREMONT, a mansion or country seat at Esher, Surrey, built by a noble family of that name. When the Princess Charlotte, heiress-apparent to the crown of England, was married to Prince Leopold of Saxe-Cobourg, C. was assigned as

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their residence; and at the death of the princess in 1817, the use of it was continued to the widower for life, along with the allowance settled on him of £50,000. The prince lived here till his election as king of Belgium, after which time he only occasionally visited it. After the revolution of February 1848 he placed it at the disposal of his father-in-law, ex-king Louis Philippe, who inhabited it till his death in August 1850, and whose family have since continued to reside there. C. has been to the younger line of the House of Bourbon what Frohsdorf is to the elder, and has been the scene of more than one congress of the leading Orleanists.

CLA'RENCIEUX, the first of the two provincial Kings-of-Arms, in England, the second being Norroy. The jurisdiction of C. extends to all England, south of the Trent, that of Norroy (q. v.) comprehending the portion north of that river. C. is named after the Duke of Clarence, third son of King Edward III. It is his duty to visit his province, to survey the arms of all persons bearing coat-armor within it, to register descents and marriages, and to marshal the funerals of all persons who are not under the direction of *Garter*. He also grants arms within his province, with the approval of the Earl Marshal.

CLA'RENDON, Constitutions of, were laws made by a parliament, or rather by a general council of the nobility and prelates, held at Clarendon, a village in Wiltshire, in 1164, whereby King Henry II. checked the power of the church, and greatly narrowed the total exemption which the clergy had claimed from the jurisdiction of the secular magistrate. These famous ordinances, 16 in number, defined the limits of the patronage, as well as of the jurisdiction, of the pope in England, and provided that the crown should be entitled to interfere in the election to all vacant offices and dignities in the church. The constitutions were unanimously adopted, and Becket, the primate, reluctantly signed them, at the solicitation of his brethren. But they were at once rejected by Pope Alexander III., when sent to him for ratification, and Becket thereupon immediately retracted his consent, and imposed upon himself the severest penances for his weakness in giving it. This, and the other measures adopted by the haughty and imperious archbishop, to vindicate the independence of his order, led to the unhappy disputes between him and the monarch, which terminated in the famous tragedy at Canterbury, commonly known as the *martyrdom* of St. Thomas-à-Becket, the canonisation of the saint, and the pilgrimages to his tomb, which subsequently became an institution of the Roman Catholic Church. Notwithstanding the personal humiliation to which Henry submitted after Becket's death, most of the provisions of the constitutions of C. continued to be permanent gains to the civil power. A masterly and dispassionate appreciation of the constitutions of C. will be found in Dr Pauli's "Geschichte v. England;" and in Professor Stubbs's "Select Charters illustrative of English Constitutional History," the text of the constitutions is given.

CLARENDON, Edward Hyde, Earl of, an English historian and statesman, son of a private gentleman, was born at Dinton, Wiltshire, 18th February 1608, and educated at Oxford. He studied law under his uncle, Nicholas Hyde, Chief-justice of the King's Bench; was a member of the Long Parliament, and for some time spoke and voted on the side of the popular party; but on the breaking out of the civil wars in England, he attached himself to the royal cause, and in 1642 was appointed Chancellor of the Exchequer, knighted, and sworn of the privy council. Accompanying Prince Charles (Charles II.) to Jersey, he remained there for two years, and began his "History of the Rebellion" (London, 1702—1704; continuation, with Life, 1759), and also wrote the various papers which appeared in the king's name, as answers to the manifestoes of the parliament, and which far surpassed in vigor and elegance the productions against which they were directed. In May 1648, he went to Paris, and in November 1649, was sent on an unsuccessful mission for assistance from the Spanish court. He afterwards proceeded to the Hague, where, in 1657, Charles II. appointed him High Chancellor of England. At the Restoration, he was confirmed in that office, and elected chancellor of the university of Oxford. In November 1660, he was created Baron Hyde, and in April following, Viscount Cornbury, and Earl of Clarendon. In 1663, the Earl of Bristol accused him of high treason in the House of Lords; and though this charge failed, public indignation was excited against him by the ill success of the war with Holland, and the sale of Dunkirk to the French. The victim also of some court intrigues,

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he was deprived of his offices; and he secretly withdrew to Calais, whence he sent his Apology to the Lords; but this writing was ordered, by both Houses of parliament, to be burned by the common hangman. After living six years in exile, he died at Rouen, December 1674, and was buried in Westminster Abbey. His daughter, Annie Hyde, became the wife, in 1659, of the Duke of York, afterwards James II., and was the mother of Anne and Mary, both queens of Great Britain.

C. was, on the whole, both well-intentioned and wise. There can be no doubt that he loved his country sincerely, and was humanely and liberally disposed. He was too moderate for the troublous times in which he lived. Lacking enthusiasm, he failed to appreciate the position of the Puritans; and after a brief period spent in their service, he passed over to the camp of the Royalists, but was never a bigoted partisan. His firmness, however, was not equal to his sagacity, and hence arose the perplexities which ultimately occasioned his fall. C.'s private character was excellent, in an age when virtue was utterly unfashionable among noblemen.

CLARENDON, George William Frederick Villiers, Earl of, a distinguished English statesman, was born 12th January, 1800. He was a descendant of Thomas Villiers, who, in 1752, married the heiress of the last Lord Clarendon of the Hyde family, and was, in 1756, made Baron Hyde, and in 1776, Earl of Clarendon. Having studied at Cambridge, he early entered the diplomatic service, and in 1833 was appointed to the then important post of ambassador at Madrid, where he acquired great influence, which he employed in establishing the government of Spain on a constitutional basis. On the death of his uncle, the third earl, without issue, in 1838, he succeeded to the title, and returned to England to take his seat in the Upper House. In 1840, he was appointed keeper of the Great Seal. When the Whig ministry was broken up in 1841, he became an active member of the opposition; but warmly supported Sir Robert Peel in his measures for the abolition of the corn-laws. Under Lord John Russell's premiership, he became President of the Board of Trade in 1846, and the following year was appointed Lord-lieutenant of Ireland. He entered upon his duties in troublous times. The insurrectionary follies of Smith O'Brien and his coadjutors might have set the whole country in a blaze, but for the prompt and decisive measures which C. adopted, and which soon restored general tranquillity. At the same time, his tact and impartiality contributed to allay and reconcile the exasperations of party. The severity of his proceedings against the Orangemen on occasion of disturbances in 1849, was made the subject of a formal accusation in the House of Lords; but C. made a convincing defence, and ministers declared their complete approval of his proceedings. When the Russell cabinet resigned in 1852, C. was replaced by the Earl of Eglinton; but on the formation of the Aberdeen ministry, in a later part of the same year, he was intrusted with the seals of the Foreign Office. When Lord Palmerston became premier in 1855, C. held the seals until the resignation of the ministry in 1858. He resumed them, under the same premier, in 1865; retired with his colleagues in 1866; and taking the same office once more in 1868, he retained it till he died in June 1870.

CLA'RET (Fr. *clairet*), a term originally applied to wines of a light-red color, but which is now used in England as a general name for the red wines of Bordeaux (q. v.). The name as used in England is unknown in France.

CLARIFICA'TION is the process of clearing a fluid from a turbid condition, as in the case of Beer (q. v.), or in the action of gelatine in fining British wines. Natural waters containing much organic matter in mechanical suspension and in chemical solution, are clarified by the addition of a little alum, which is precipitated with the organic matter, and the water then becomes healthy and refreshing. Liquids are often clarified by straining through several layers of cloth; and the addition of cold water to hot coffee, &c., causes a deposit to be thrown down, which clears the solution. The use of the CLEARING NUT (q. v.), for clarifying water, is general in India.

CLA'RINET, or Cla'rionet, a wind-instrument of the reed kind, invented by Joseph Christoph Denner, in Nürnberg, in 1690. Its tone is produced by a thin piece of Spanish reed nicely flattened, and tied, or otherwise fixed on the mouth-piece. On the body of the instrument there are holes and keys for the fingers of the performer, by which the notes are produced. In extent, fulness, and variety of tone, the C. is the most perfect of wind-instruments. Its construction, however,

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does not admit of every key in music being played on the same instrument, for which reason clarinets of different pitch are used in orchestral music—viz., the C C., which plays all the notes as they are written; the B flat C., a whole tone below the C; and the A C., a minor third below the C. In military music, an E flat C., a minor third above the C one, is much used.

CLA'RION, or Cla'rin, a species of trumpet, more shrill in tone than the ordinary one, also the name of an organ-stop of four feet pitch.

CLARK, Sir James, Bart., a distinguished physician, was born at Cullen, Banffshire, December 1788. His early education was obtained at the grammar-school of Fordyce; and he afterwards passed to King's College, Aberdeen, where he took the degree of M.A. He studied medicine at Edinburgh and London, and entered as a navy surgeon in 1809—a position he held until 1815. Taking his degree of M.D. in Edinburgh in 1817, he, after travelling on the continent, settled at Rome, where he practised as a physician for eight years. In 1826, he took up his residence in London, where he soon secured for himself a prominent place among the most eminent medical men of the time. On the accession of Queen Victoria to the throne, C., who for two years previously had acted as physician to the Duchess of Kent, was appointed physician in ordinary to her Majesty; and in that capacity he attended the Queen on most of her journeys to Scotland and the continent. He was created a baronet in 1838. Among the most important of C.'s contributions to medical science, is his work "On the Sanative Influence of Climate," a subject upon which he was considered a high authority; and "A Treatise on Pulmonary Consumption," in which he shewed that this destructive malady is one of the general health, depending upon mal-assimilation of the food, and to be prevented, and in certain cases arrested, by a wise regulation of food, air, and exercise. He was among the first in his profession, along with Dr Andrew Combe and Sir John Forbes, who demonstrated the importance of the study of the laws of health, in order to the salutary direction and control of morbid action in disease; and he did great public and professional good by inculcating attention to the powers of recovery inherent in all living organisms. C. edited the last edition of Dr Combe's "Management of Infancy." He died June 99, 1870.

CLARKE, Adam, LL.D., an eminent minister and scholar of the Wesleyan Methodists, was born about 1762 in the north of Ireland. He studied at Kingswood, near Bristol, and at the age of twenty became a preacher or evangelist, in which capacity he obtained a great name and seems to have exercised a most beneficial influence. Although the office of a Wesleyan pastor is very unfavorable for the development of scholarly habits, C. contrived to find time for extensive study. His first work was a "Bibliographical Dictionary," published in 1802. His attainments in oriental literature and biblical knowledge procured for him the degree of LL.D. from St. Andrews university. The Board of Commissioners on the Public Records selected him to edit Rymer's "Fœdera." He also edited and abridged several other works, but the great work of his life was his edition of the Holy Scriptures in English, illustrated with a commentary and critical notes, into which were compressed all the results of his varied reading. The first volume appeared in 1810, the eighth and last in 1826. C. died Aug. 26, 1832.

CLARKE, Edward Daniel, known as a traveller and author, was born at Willingdon, in Sussex, in 1769. He studied at Cambridge, and from 1790 to 1799 was employed as tutor and travelling-companion in several noblemen's families, and made the tour of Great Britain, France, Italy, Switzerland, and Germany. In 1799, he set out on an extensive tour with Mr Cripps, a young man of fortune; they traversed Denmark, Norway, Sweden, Lapland, Finland, Russia, the country of the Don-Cossacks, Tartary, Asia Minor, Syria, Egypt, Greece, and did not return to England till 1802. In consequence of his donations to the university of Cambridge, C. received the degree of LL.D. In 1807, he began a course of lectures on mineralogy, and the university established a professorship of that science in his favor. He presented to the library of Cambridge a number of valuable marbles collected during his travels; among others, the colossal statue of the Eleusinian Ceres, on which he wrote a treatise in 1803. England is also indebted to him for the possession of the famous sarcophagus with the inscription in three languages. On this he wrote a treatise: "The Tomb of Alexander, a Dissertation on the Sarcophagus brought from

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Alexandria, and now in the British Museum" (Lond. 1805). His "Travels," of which the first volume was published in 1810, and the fifth in 1819, were received with extraordinary favor. An additional volume, containing his "Travels through Denmark, Sweden, Lapland, Norway, Finland, and Russia," was published after his death (Lond. 1823). A complete edition of his travels appeared in 11 vols. (Lond. 1819—1824). The university of Cambridge purchased his Greek and oriental manuscripts, among which is the famous Codex of Plato, which C. discovered in the island of Patmos. C. died March 9, 1822.

CLARKE, Dr Samuel, an eminent philosopher and theologian, was born at Norwich, October 11, 1675, and educated at Cambridge. The system of Descartes at that time held almost universal sway; but this failing to satisfy his mind, he adopted the views of his contemporary and friend Newton. Along with philosophy, he pursued the study of theology and philology. He was some time chaplain to the Bishop of Norwich, a promoter of science; he afterwards became chaplain to Queen Anne, and in 1709 rector of St James's. By his work on the Trinity (1712), in which he denied that that doctrine was held by the early church, he brought himself into considerable trouble. The convocation of Bishops, who wished to avoid controversy, contented themselves with an explanation, anything but satisfactory, and a promise from C. to be silent for the future on that subject. His views were of the kind known as *Semi-Arian*. For the rest, C. was a vigorous antagonist of the freethinkers of his time; in opposition to Dodwell, he sought to demonstrate the immortality of the soul from the idea of an immaterial being. He died May 17, 1729. His most famous work is "Demonstration of the Being and Attributes of God" (Lond. 1705); connected with it in subject is his "Verity and Certitude of Natural and Revealed Religion" (Lond. 1705). At the instigation of the Princess of Wales, who was inclined to the doctrines of Leibnitz, C. entered into a keen correspondence with that philosopher on space and time, and their relations to God, on moral freedom, &c. This correspondence was published under the title of "Collection of Papers which passed between Leibnitz and Clarke in the years 1715 and 1716" (Lond. 1717). In his ethical disquisitions, he seeks to find a foundation for moral obligation in a peculiar principle, which he calls the *fitness of things*, or the relations of things established from eternity by God. He published a valuable edition of Cæsar (Lond. 1712); that of Homer (Lond. 1729—1746) was completed by his son. A collected edition of his philosophical works appeared in 4 vols., Lond. 1738—1742.

CLARKSON, Thomas, an eminent philanthropist, the son of a clergyman, master of the Free Grammar-School at Wisbeach, Cambr., was born in that town, March 28, 1760. He studied at Cambridge University, and was led to become the promoter of the anti-slavery agitation in Great Britain by a Latin prize-essay which he wrote in 1785, on the question, "Is it right to make slaves of others against their will?" An English translation, on being published, had an extensive circulation, and C. resolved to devote his life to a crusade against African slavery. Associations were formed, and, besides visiting the principal towns of England, and even going to Paris, in the cause, C. published numerous essays, pamphlets, and reports on the subject. Mr. Wilberforce, M.P., whose co-operation C. had secured, took the lead in the anti-slavery agitation, and in 1787 brought the subject before parliament. On March 25, 1807, the law for the suppression of the slave-trade passed the legislature, and C. subsequently wrote a "History of the Rise, Progress, and Accomplishment of the Abolition of the African Slave-trade," 2 vols. 8vo, 1808. On the formation of the Anti-slavery Society, in 1823, for the abolition of slavery in the West Indies, C. became one of its leading members, and saw the object of its efforts attained in 1838. He took an active part in other benevolent schemes, particularly in establishing institutions for seamen in seaport towns, similar to the Sailors' Homes. He was in deacon's orders in the Church of England, but manifested great liking for the Society of Friends although he never joined them. He died September 26, 1846.

CLARY (*Salvia sclarea*), a plant of the same genus with Sage (q. v.), a native of Italy and other southern countries of Europe, and which has been cultivated in British gardens from a very early period for its aromatic and other properties. It is a biennial, about 2 feet high, with clammy stem, large, heart-shaped, rough, and doubly crenate leaves, and whorls of pale-blue flowers in loose terminal spikes, with large colored bracteæ. The seed is generally sown in spring, and the plants flower in the second year. C. is antispasmodic and stimulating. It has an odor

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resembling that of Balsam of Tolu, and is used for seasoning soups, and in confectionary for flavoring. Its flowers are used for making a fermented wine, esteemed for its flavor.—A British species of *Salvia* (*S. Verbenaca*) is sometimes called Wild Clary.

CLA'SSICS. The term *classici* was originally applied to those citizens of Rome that belonged to the first and most influential of the six classes into which Servius Tullius divided the population. As early as the 2d c. after Christ, it is applied figuratively by Gellius to writers of the highest rank, and this mode of designation has since been very generally adopted both in literature and art. Most nations have had at some one time a more than usual outburst of literature, and they usually style this the Classical period of their literature, and its most distinguished writers their Classics. But as the great productions of the writers and artists of antiquity have continued to be looked upon by moderns as models of perfection, the word C. has come to designate, in a narrower sense, the best writers of Greece and Rome, and "classical" to mean much the same as "ancient."

CLAUDE, St, a town of France, in the department of Jura, romantically situated at the confluence of the Bienne and Tacon, 25 miles south of Lons-le-Saulnier. The town originated in an abbey erected here in the 5th century. The abbey enjoyed extensive privileges, including a very oppressive one—viz., that a year's residence on the abbey lands made a peasant a serf. Serfdom continued down to the Revolution. St C. has a fine cathedral, and manufactures of cotton and paper; and musical-boxes, snuff-boxes, toys, and fancy articles of horn, bone, &c., are largely made. Pop. (1872) 6085.

CLAUDE LORRAINE (properly named CLAUDE GELEE), a celebrated landscape-painter, was a native of Lorraine, and born in 1600. A relative, who travelled as a lace-dealer, took C., when still a boy, to Italy, but deserted him in Rome. However, he soon found employment in grinding colors, and doing other menial services for Agostino Tassi, a landscape-painter, from whom he gained some knowledge of art. He next studied under Godfrey Waals at Naples, and after some time spent in wandering through various portions of Europe, he finally settled at Rome in 1627. The demand for his pictures rapidly increased, and he received numerous commissions. C. died of gout in 1682.

C.'s landscapes are found in the chief galleries of Italy, France, Spain, and Germany, and in particular England, which, according to Dr. Waagen, contains 54 paintings by Claude. Four of his best works—the landscapes known as "Morning," "Noon," "Evening," and "Twilight"—are in the royal gallery at St. Petersburg. The painting on which C. himself set the highest value is the "Villa Madama." He kept it as a study, and refused to sell it, even when Pope Clement IX. offered for it as much gold coin as would cover the canvas. As C.'s paintings have always commanded very high prices, many copies and imitations have been imposed on buyers. This was the case even during the artist's lifetime; for he set high prices on his works. In order to stop the fraudulent trade carried on in his name, he collected the sketches of his pictures in 6 books, to which he gave the title "Libri Veritatis." They are now in the library of the Duke of Devonshire.

C. was an earnest, indefatigable student of nature, and possessed great invention. No one could paint with greater beauty, brilliancy, and truth the effects of sunlight at various hours of the day, of wind on foliage, the dewy moistness of morning shadows, or the magical blending of faint and ever-fainter hues in the far horizon of an Italian sky; but it has been affirmed—especially of late—that his conception is often artificial, conventional, and positively untrue, and it must certainly be admitted that his introduction of pseudo-Greek architecture into modern scenery is in the very worst taste. His figures are in general such inferior accessories, that he was wont to say he made no charge for them when he sold his pictures. In his private character, C. was amiable and very generous.

CLAUDET'S FOCI'METER, an instrument for ascertaining the coincidence or non-coincidence of the chemical and visual foci in portrait or landscape combinations of lenses. It consists of eight fans or equal segments of a circle, arranged spirally round a horizontal axis; they are white, and numbered from one to eight with black figures, and when in use, are so placed as to be all seen together from

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the lens. The method usually adopted in testing a lens is, to focus with great accuracy the fan numbered 4, and take a photograph of the instrument, in which, if No. 4 be the sharpest and best defined, it is a proof of the coincidence of the chemical with the visual focus; if, however, No. 3 should be sharper, the lens has been under-corrected; if No. 5, the lens has been over-corrected; in the former case, the lens must be turned more towards the ground glass, and in the latter further from the ground glass.

CLAUDIA'NUS, Claudius, a Latin poet of Alexandria, lived in the end of the 4th and beginning of the 5th century. He wrote first in Greek, which appears to have been his native tongue (though he was originally of Roman extraction); but, as Gibbon says, he "assumed in his mature age the familiar use and absolute command of the Latin language; soared above the heads of his feeble contemporaries; and placed himself, after an interval of 300 years, among the poets of ancient Rome." His poems brought him into such reputation, that, at the request of the senate, the Emperors Arcadius and Honorius erected a statue in honor of him in the forum of Trajan. The productions of C. that have come down to us, consist of two epic poems, "The Rape of Proserpine," and the incomplete "Battle of the Giants;" besides Panegyrics on Honorius, Idyls, Epigrams, and occasional poems. C. displays a brilliant fancy, rich coloring, with variety and distinctness in his pictures; but he is often deficient in taste and gracefulness. A good edition of his works was published by Gesner (Leip. 1759), more recently by Doullay (Paris, 1836). An English translation was executed by A. Hawkins (London, 2 vols. 1817).

CLAU'DIUS I., Tiberius, a Roman emperor, the youngest son of Nero Claudius Drusus, step-son of the Emperor Augustus, was born at Lyon 10 B.C. He was naturally sickly and infirm, and his education was neglected or left to be cared for by women and freedmen. His supposed imbecility saved him from the cruelty of Caligula; but C. in his privacy had made considerable progress in the study of history, and wrote in Latin and Greek several extensive works now lost. After the assassination of Caligula, C. was found by the soldiers in a corner of the palace, where in dread he had concealed himself. The prætorians carried him forth, proclaimed him emperor, and compelled his recognition by the senate and many citizens who had hoped to restore the republic. By his payment of the troops who had raised him to the throne, C. gave the first example of the baneful practice which subjected Rome to a military despotism under the succeeding emperors. The first acts of his reign seemed to give promise of mild and just government, but in the year 42, when a conspiracy against his life was detected, his timidity led him to yield himself entirely to the guidance of his infamous wife, Messalina, who in concert with the freedmen Pallas and Narcissus, practiced cruelties and extortions without restraint. C. meanwhile lived in retirement, partly occupied in studies, and expended enormous sums in building, especially in the famous Aqua Claudia (Claudian Aqueduct). This great work occupied 30,000 laborers during eleven years. Abroad the armies of C. were victorious. Mauritania was made a Roman province, the conquest of Britain was commenced, and some progress was made in Germany. After the execution of Messalina, another woman equally vicious and more cruel, Agrippina (q. v.), married the emperor, and destroyed him by poison 54 A.D., in order to secure the succession of her son Nero. After his death C. was deified.

CLAUSE. See DEED.

CLAUSEL, Bertrand, a French marshal, was born at Mirepoix, in the department of Ariège, December 1772, and entered the army at an early age. He commanded a brigade in the Italian campaign of 1799; was made a general of division of the Army of the North in 1802; and distinguished himself in the campaign of 1809 against Austria. The chief field of his fame, however, was Spain, where, after the battle of Salamanca, July 22, 1812, he succeeded Marmont in the command. He conducted the very difficult retreat from Portugal with the greatest circumspection, having to sustain a succession of battles. Although he had fought for Napoleon to the last, Louis XVIII., on his first restoration, named him inspector-general of infantry. When Napoleon again landed in France in 1815, C. immediately declared for him, was made a peer, and received the command of the Army of the Pyrenees. On the return of the Bourbons he was declared a traitor, but escaped to America;

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was condemned to death in his absence, but was subsequently permitted to return to France; and in 1830, after the July revolution, he received the command of the troops in Algeria, and made a successful expedition over the Atlas range into the province of Titeri, for which he was made marshal of France. Some misunderstanding, however, soon led to his recall; but he was again appointed governor-general of Algeria in 1835. After the disasters that befell the French arms before Constantine in 1836, and which were attributed in great part to him, he returned to France and defended himself—though not quite successfully—both from the press and the tribune, against the attacks made upon him. C. died at Secourrieu (Haute Garonne), 21st April 1842.

CLAU'SENBURG. See KLAUSENBURG.

CLAU'STHAL. See KLAUSTHAL.

CLAVAGE'LLA, or Club-shell, a genus of Lamellibranchiate Mollusks of the same family with Aspergillum (q. v.), of which fossil species were first known to naturalists, but existing species have also been discovered. These mollusks inhabit holes, which they excavate for themselves in rocks or in masses of coral, and the ordinary form of the bivalve shell is curiously modified; one valve being fixed to the inner surface of the chamber in which the animal lives, and the other free and capable of motion on its hinge within that chamber, whilst the shelly substance of the fixed valve is continued without interruption into a tube extending from the chamber outwards. The young mollusk is supposed to make its way into the rock by excavating this tube, but whether its excavations are accomplished by mere mechanical means, or by the aid of some chemical solvent, is still uncertain.—Fossil *Clavagellæ* have not been found in any strata older than the supracretaceous group.

CLAVA'RIA, a genus of *Fungi* of the division *Hymenomycetes*, subdivision *Clavati*. The spores are produced equally on all parts of the surface. The species are numerous, some of them simple and club-shaped, some branched. Some are natives of Britain. *C. Botrytis*, a species common in oak and beech woods in Germany, growing on the ground, among moss, grass, heath, &c., is gathered when young, and used as food, having a very agreeable sweetish taste. It ceases to be edible when it becomes old. Another German species, *C. flava*, which grows on sandy ground in fir-woods, is used in the same way. Other species appear to possess similar properties, and Liebig found them to contain the saccharine substance called Mannite. *C. Botrytis* is the *Keulenpilz*, and *C. flava* the *Zeigenbart* (goat's-beard) of the Germans.

CLA'VICLE, or Collar-Bone, a bone which, in conjunction with the Scapula (q. v.) or Blade-bone, forms the shoulder. It derives its name from the Latin word *clavis*, in consequence of its resemblance to the key used by the Romans. It is placed horizontally at the upper and lateral part of the thorax, immediately above the first rib, and it articulates internally with the upper border of the Sternum (q. v.) or Breast-bone, and externally with the acromion process (or highest point) of the scapula.

Its chief office is to keep the shoulders well separated and steady, and to afford a fulcrum by which the muscles (the deltoid and great pectoral) are enabled to give lateral movement to the arm. Accordingly, it is absent in those animals in which the movement of the fore-limbs is only backwards and forwards (in one plane) for the purpose of progression, as in the Pachydermata, Ruminantia, and Solidungula; while it is present in all Quadrumana and in those of the Rodentia in which the anterior extremities are used for prehension as well as motion, as the rat, squirrel, and rabbit; and in the Cheiroptera and Insectivora, as the bat, mole, and hedgehog. In the mole it occurs in the form of a cube, being very short and broad, and of extreme strength. In many of the Carnivora (the cat, for example), the C. is present in the rudimentary form of a small bone suspended (like the hyoid bone in the neck) among-st muscles, and not connected either with the sternum or with the scapula. In Birds, where great resistance is required to counteract the tendency of the enormous pectoral muscles to approximate the shoulders, the clavicles are large and united at an angle in the median line (just above the anterior end of the sternum) into a single bone, anatomically known as the "furculum," but popularly recognised as "the merry-thought." In this class of animals, additional, and even more

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efficient, support to the anterior extremity is afforded by the extension of the coracoid process of the scapula into a broad thick bone called the "coracoid bone" (q. v.), which extends to the sternum. It is unnecessary to trace the various modifications which this bone presents in Reptiles and certain Fishes.

In the human subject, the C. being exposed to the full force of blows or falls upon the shoulder, and not being easily dislocated (in consequence of its being well secured at both ends), is very frequently broken.

Ossification takes place in the C. earlier than in any other bone, commencing as early as the 30th day after conception, according to Beclard; and at birth it is ossified in nearly its whole extent. Mr Humphrey (in his admirable "Treatise on the Human Skeleton") suggests that the early ossification of this bone is a provision on the part of nature to prevent it from being fractured at birth in case of difficult labor.

Much important anatomical and physiological matter in connection with this bone will be found in Humphrey's work above cited, and in a memoir which he has recently published in the Transactions of the Cambridge Philosophical Society; in Owen, "On the Nature of Limbs;" and in Struthers, "Osteological Memoirs, No. 1, The Clavicle."

CLAVICO'RNÉS (Lat. club-horned), a great family of coleopterous insects, of the section *Pentamera*, distinguished by the club-shaped termination of the antennæ, which are longer than the maxillary palpi. Most of the beetles of this family feed on animal substances, and many of them, and particularly their larvæ, find their appropriate food in substances undergoing decay. It contains many genera, divided into groups (tribes), *Histeroides, Silphales, Dermestini*, &c. Burying Beetles and the Bacon Beetle may be mentioned as examples of it.

CLAVI'GERO, Francesco Saverio, a Mexican historian, was born in Vera Cruz, South America, about 1720, and entering the order of the Jesuits, was educated as an ecclesiastic. Sent as a missionary among the Indians in various parts of Mexico, he lived among them for 36 years, and made himself fully acquainted with the languages, traditions, and antiquities of the aboriginal tribes. On the suppression of the Jesuits in South America by Spain, in 1767, C. sailed for Italy, and with others of his brethern had the town of Cesena assigned to them by the pope as a place of residence, where he died October 1793. He wrote in Italian a "History of Mexico," a comprehensive and valuable work, of which an English translation by C. Cullen was published in 1787, in 2 vols. 4to.

CLAY (Ang.-Saxon *cleg*; of the same root as *clag, claggy*), a term applied, in a vague way, to those kinds of earth or soil which, when moist, have a notable degree of tenacity and plasticity. The clays are not easily distinguishable as mineral species, but they all appear to owe their origin to the decomposition of other minerals, and to consist chiefly of alumina in combination with silica and with a certain amount of water. See ALUMINA, SHALE, LOAM, PIPE-CLAY, KAOLIN, &c. Common C., when, from the large proportion of alumina which it contains, it is sufficiently plastic, is of great use for making bricks (q. v.), tiles, &c.

C. is used by sculptors and others engaged in the production of works of plastic art, as a means of adjusting the form which is to be given to their work, in the harder or more enduring substance of which it is ultimately to be composed. At modelling C. is apt to crack in drying, it must be kept damp by sprinkling water over it, and covering it with a wet cloth when the artist is not engaged in his work.

CLAY SOILS derive their character from the alumina which they contain in a state of mixture, as well as in chemical combination with other substances. Some soils contain as large a proportion of alumina as 40 per cent., but generally the proportion is much smaller. The felspar which chiefly yields the alumina of clay soils contains also soda and potash, substances essential to vegetables, and which tend to render clays fertile when under cultivation. The physical characters, however, of the different varieties of clay soils arising from the varying proportions of silica, and other substances mixed with the alumina, are chiefly concerned in their relative fertility. Calcareous matter exercises a considerable influence on their powers of producing crops.

In Scotland, clay soils are chiefly found on the coal-measures, the boulder-clay, and as alluvium in the valleys. Those derived from the coal-measures are generally

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unkindly, being tenacious and difficult to labor. In the eastern counties, these are usually farmed on a five or six course shift, according to their quality. In the western, the moister climate is less suited for cultivating them to advantage, and daily husbandry usually prevails where they are found under culture. The clay soils derived from the boulder-clays are also generally coarse and inferior in quality. The richest clay soils are found along the margins of the rivers, and go under the name of *carse* clays, which have already been described under that head. In the north of England, the aluminous shales of the coal-measures yield soils very similar in their properties to those in Scotland. England also abounds in clay soils derived from other geological formations. The chief of these are the London, plastic, weald, Gault, and blue lias clays. The stubborn character of many of them is such that they are not suitable for tillage, but form excellent meadows and pastures. In the dry climate of Suffolk, strong clays are cultivated with great success on the four-course shift—1. Seeds, 2. Wheat, 3. Fallow or Roots, 4. Barley. Thorough drainage has greatly increased the value of clay soils under cultivation. Being so much sooner dry in spring, a longer period is obtained for preparing the land for putting in the crops. Weeds, too, are much more easily extirpated, and the strength of the soil is more entirely directed towards the raising of the crops. Wheat, beans, and clover are the crops which clay soils carry in greatest perfection. Clay soils have been long known to be retentive of moisture as well as of manure. Recent chemical investigations have shown, that clay soils have remarkable powers for absorbing ammonia, potash, and other substances, which constitute the food of plants. This property, it is now pretty well ascertained, arises from surface attraction.

CLAY, Cassius M., a zealous abolitionist, born in Kentucky, 1810, graduated at Yale College, 1832, and three years after was elected to the legislature of his native State. C. opposed the annexation of Texas, 1844; started "The True American," a vigorous anti-slavery paper, the following year; volunteered in the Mexican war, 1846; supported Mr Lincoln in 1860; and in 1862 was appointed U. S. Minister to Russia, a post he held till 1869.

CLAY, Henry, an American statesman of some distinction, was born April 12, 1777, in Hanover county, Virginia. He early devoted himself to the law, and fixing his residence at Lexington, Kentucky, soon obtained a lucrative practice and political influence enough to be elected to the state legislature. In 1806 he was elected to Congress, and again in 1809 he was chosen senator for a term of two years. In 1811 he was sent to the House of Representatives, where he was immediately elected Speaker. A strong advocate of nationality, he denounced the claims put forth by England as to right of search; he was a strenuous supporter of the war with that country, and in consequence was sent, in 1814, as one of the commissioners to sign the treaty of peace at Ghent, where his acuteness secured for America some advantages. On his return, he exerted all his talents in favor of the independence of South America, and labored hard to eradicate all European influence from the American continent. C., however, is best known as the author of the famous "Missouri Compromise," restricting slavery to the states south of 36° 30′ n. lat.; and also for the compromise of 1850, known as C.'s "Omnibus" measure. He died in June 1852. C. had undoubted talents, but he was by no means a comprehensive statesman. He was by far too fertile in compromises to be the author of any measure conferring lasting benefit on his country. He was very popular during his lifetime, and was two or three times proposed for the presidency, an honor, however, which he never succeeded in obtaining.

CLAY'MORE (meaning "the great sword"), the Gaelic name for a kind of sword at one time much used, but not so well known at present. It had a double-edged blade, about 48 inches long by 2 inches broad; its handle was often 12 inches long, and its weight 6 or 7 lbs.

CLAZO'MENÆ, one of the twelve cities of Ionia. It was originally built on the Hermæan Gulf, westward from Smyrna; but the inhabitants having, through fear of the Persians, fled to a neighboring islet, and Alexander the Great having connected the islet with the mainland by a dike, the city subsequently extended over the peninsula thus formed. It is now called Vurla.

CLÉA'NTHES, a Stoic philosopher, born at Assos, in Troas, about 300 B.C. His poverty was such, that he had to work all night at drawing water, in order to obtain

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money for his support, and to pay his class-fee while attending the lectures of Zeno. For nineteen years he listened patiently to the great Stoic, and, on his death, succeeded him in his school. He died of voluntary starvation when about 80 years old. C. differed it is said, from the other Stoics, in regarding the sun as the governing principle of the world; but none of his writings are extant except a "Hymn to Zeus," one of the purest and noblest pieces of poetry in the Greek language. It is an admirable union of religious feeling and philosophic thought, and impresses us very strongly in favor of the author, who, from all we can learn, was a man of stern and serious character. The "Hymn to Zeus" was published in Greek and German by Cludius (Göttingen, 1786), and re-edited by Merzdorf (Leip. 1835).

CLEAR, Cape, a headland of Clear Island, the most southerly extremity of Ireland, and locally belonging to Cork county. Cape C. is elevated more than 400 feet above the sea, and has a light-house, lat. 51° 26′ n., long. 9° 29 w., with a bright revolving light 455 feet above the water-level.

CLEARANCE, in the mercantile marine, is a permission from the custom-house officers, or the emigration officers, or both, for the departure of a ship from a port, denoting that all the formalities have been observed, and all dues, &c., paid. If a foreign vessel, she must also be certified by the consul of the nation to which she belongs. Hence the expression *cleared out*, in reference to the departure of a particular ship.

CLEA'RING-HOUSE, in Banking. The business facilities afforded by bankers to their customers in collecting their bills, cheques on other firms, and like obligations, early imposed the necessity for an organised form of interchange of such securities, which would at once save labor and curtail the amount of floating cash requisite to meet the settlements of the bankers if effected singly. This was first done by the clerks, when out collecting from the different banking-houses, meeting daily at the counter of one of the houses for the purpose; but about 1775, the building in Lombard street, known as the "Clearing-house," was set apart for it, under the direction of a committee delegated by the different firms, and the immediate management of two paid inspectors. The arrangement of the establishment may be briefly described: From time to time during the day each firm transmits to the C. cheques and bills which are payable by other bankers for classification, taking account of the obligations coming against their firm, so that, at the close of the day, they are the better able to make up their private books. At 4 o'clock the accounts are closed; each bank has till 4.45 to decide whether it will honor the drafts upon it; and by half-past 5, the officials are able to learn that the several houses are agreed between themselves, who has to pay money and who has to receive, and how much, by making up an account of the form subjoined. It is made up as between the particular bank receiving it and the C. representing every other bank with whom the former may have had any business on the day in question:

GLYN.

Debtors.	Balance.		Balance.	Creditors.
280,000	20,000	Barclay		260,000
50,000	10,000	Bosanquet		40,000
110,000		Commercial	10,000	120,000
115,000	5,000	Currie		110,000
50,000	5,000	Fuller		45,000
100,000	10,000	Hanbury		90,000
110,000		Hankey	5,000	115,000
280,000		Jones	20,000	300,000
150,000		Lubbock	10,000	160,000
200,000		Masterman	15,000	215,000
50,000		Olding	5,000	55,000
65,000	5,000	Spooner		60,000
165,000	5,000	Union		160,000
	60,000		65,000	

The comparatively small balance thus exhibited used to be settled by each bank-

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ing house which owed money sending down to the C. the amount, and paying it not to the officials there, but to any clerk whose house claimed a balance. But now, to avoid the risk of handling such a large amount of bank notes, it is settled by means of a species of cheque on the Bank of England appropriated to the purpose, called *transfer tickets*, signed by each banking house and certified by an inspector of the clearing house. A white one is used when the bank has to pay a balance to the C., and a green one when it has to receive a balance from it. By this means transactions to the amount of several millions daily are settled without the intervention of a bank note, and the importance of the arrangement may be assumed from the fact, stated in evidence before the House of Commons, that before the connection of the London and Westminster Bank with the C., they were obliged to keep in hand £150,000 in notes for negotiating their exchanges.

CLEARING-HOUSE, The Railway, is an association instituted to enable railway-companies in England and Scotland, to carry on, without interruption, the through traffic in passengers, animals, minerals, and goods passing over different lines of railways, and to afford to the traffic the same facilities as if the different lines had belonged to one company. The arrangements are called "the clearing system," and are conducted by a committee appointed by the directors of the companies who are parties to it. The business is carried on in a building in Seymour street, London, adjoining the Euston Station. The association is regulated by act of parliament, 13 and 14 Vict. 33 (25th June 1850), called "The Railway Clearing Act, 1850." Any railway-company may apply for admission to the system, and, on being accepted, becomes a party to it. The companies are each represented on the committee by a delegate. Ten delegates form a quorum. The committee holds stated meetings on the second Wednesday in March, June, September, and December in every year, and at such other times as may be found necessary. The accounts of the clearing-system, and the balances due to and from the several companies, are settled and adjusted by the secretary of the committee, with appeal to the committee, whose decision is final. The expenses are defrayed rateably by the companies. The clerks at stations of the various companies send abstracts of all traffic monthly. The collected passenger-tickets are also sent monthly. Number-men are employed by the C. who attend at each railway-junction, and watch the arrival and departure of every train passing the junction. They note the number of every carriage, horse-box, wagon, van, and sheet or wagon-cover on the train going beyond the parent line, and also all damaged stock, and make weekly returns. The destination of each wagon is also noted. The returns from the companies' stations, together with those of the number-men, enable the accounts to be made up at the C., and, after examination, the companies are debited and credited, as the case may be. A debtor and creditor account is sent from the C. monthly to each company, shewing, on the one side, what the company has to receive from others as their proportion of through passenger-fares, through goods rates and mileage of carriages, wagons, and sheets, and, on the other side, what the company has to pay to others out of monies drawn by them. The balance is struck, and, if against the company, a remittance must be made. If the balance is on passenger traffic or stock, it is due five days after the date of the C. advice. The other balances must be paid within 23 days. Interest at the rate of 7 per cent. per annum is charged on outstanding balances. The cost of maintaining the C., with its officers and numerous clerks and number-men, is apportioned amongst the respective companies—(1.) In proportion to the number of entries at the credit of each in the mileage account; (2.) In the ratio of the number of vehicles and sheets recorded by the number-men; and (3.) According to the time occupied on the accounts.

Regulations are published annually by the C. in January, for the guidance of the different companies in connection with the system. These determine the principles of classification of goods, division of rates, terminal allowances, payment for loss or damage of goods, and other points. A committee of general managers is appointed, whose duty it is to arbitrate on claims for damages to rolling-stock. A committee of goods' managers adjudicate cases of disputed liability which relate to goods' traffic. A committee of coaching superintendents perform a similar duty with reference to coaching or passenger traffic. The mileage of carriages is also regulated, being three-farthings per mile first class, and a half-penny for second. A varying rate for wagons and sheets is allowed according to distance, the charge

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for distances under 150 miles being about one half-penny for box-wagons, ¾ of a penny for open wagons, and ½ of a penny for sheets. If carriages are detained beyond one clear day, demurrage is charged at the rate of 10s. per day for first-class carriages, and 6s. for second class. If wagons are detained beyond two clear days, 8s. a day is charged. Sheets, after two days, are charged 6d. for the first day, and 1s. per day after. The terminal allowances are 8s. 6d. per ton in London, and 4s. in the country for carted goods; 1s. 6d. per ton when not carted.

In 1873, the number of companies parties to the clearing-system was 98, and the amount of business of an intricate kind which was involved may be judged of from the foregoing particulars. In short, the C. system of Great Britain is a vast organisation, adapted, in an extraordinary degree, to save trouble in accounting, as well as to prevent petty disputes, among the individual companies concerned. The very circumstance of the great bulk of the used passenger tickets in the kingdom being transmitted to a common centre for adjustment as to the claims of one company against another, affords in itself a remarkable instance of an ingenious system for elaborating simplicity out of what would almost appear a commercial chaos.—There is a similar railway C. system in Ireland, with its headquarters in Dublin.

CLEARING-NUT (*Strychnos potatorum*), a small tree of the same genus with the NUX VOMICA (q. v.), abundant in the forests of India, and of which the seeds are much used for clearing water. They are sold for this use in the bazaars, and travellers commonly carry some with them. These seeds being rubbed on the inside of a vessel, muddy water put into it very quickly becomes clear, all impurities settling to the bottom. The tree has a deeply fissured bark; ovate, smooth, and pointed leaves; and a shiny, black, pulpy fruit, with only one seed. The wood is very hard, and is used for various purposes.

CLEARNESS, a quality of art which is realised by a skilful arrangement of colors, tints, and tones. Where C. is to be obtained without sacrificing depth, a knowledge of *chiaroscuro* (q. v.) becomes indispensable.

CLEAR-STORY, or Clere-Story. Originally this term was applied generally to the upper part of any building, which was lighted by several windows, or by a row of small windows or openings in the wall. Latterly, it came to be applied exclusively to the upper part of the central aisle of a church, in which windows were found above the roof of the side aisles. The object of the C. in churches appears to have been to increase the light in the nave, but the windows in our existing churches are generally so small as to effect this object very imperfectly. In many churches, the C. is a subsequent addition, and has often been added when the high-pitched roof, which included the side aisles in its span, gave place to a flat one covering the nave only. The walls over the arches of the nave were then raised so as to receive the C. windows.

CLEATS, in Ship-building, are pieces of wood fastened to various parts of the vessel, and having holes or recesses for fastening ropes. There are several kinds, applied to various purposes, and bearing the names of *belaying, comb, mast, shroud single, stop, thumb*, &c., cleats.

CLEAVAGE, or Slaty Cleavage, is a condition of rocks in which they split easily into thin plates. The direction of these laminæ may be in the plane of stratification, but it much more frequently differs from it. C. is the result of an operation which is subsequent to, and entirely independent of, the original stratification of the rocks. It is impossible to determine what is the producing cause of this phonomenon. By some it has been considered to be due to crystalline agency, while others maintain that it arises from the pressure of mechanical forces at right angles to the planes of C., and yet others seek an explanation in a combination of these two agencies. Professor Sedgwick, who has carefully examined the phenomena of C., has arrived at the following general results: 1. That the strike of the C. planes, when they were well developed, and passed through well-defined mountain-ridges, was nearly coincident with the strike of the beds; 2. That the dip of these planes (whether in quantity or direction) was not regulated by the dip of the beds, inasmuch as the C. planes would often remain unchanged while they passed through beds that changed their prevailing dip, or were contorted; 3. That where the features of the country or the strike of the beds was ill defined, the state of the C. became also ill defined, so as sometimes to be inclined to the strike of the

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beds at a considerable angle; 4. Lastly, that in all cases where the C. planes were well developed among the finer slate-rocks, they had produced a new arrangement of the minutest particles of the beds through which they pass.

C., though generally confined to clay-slate, yet occasionally occurs in lime and sandstone; but in proportion as the rocks are coarse, the C. planes become fainter and wider apart. In the fine grained clay-slate, on the other hand, the laminæ are thin, smooth, and parallel; and as C. is always accompanied with more or less induration in the rock where it exists, clay-slate, thus altered, is of great economic value for roofing.

CLEAVERS, or Goose-grass (*Galium Aparine*), a species of Bedstraw (q. v.), a coarse annual, with whorls of 6—8 leaves, both stem and leaves rough with reflexed bristles, the fruit also hispid, and when ripe, very ready to adhere to any passenger who may brush against it; a very common weed in hedges and bushy places in Britain and most parts of Europe; but which has, from time to time, been brought into notice as possessing a remarkable specific power over some of the most formidable cutaneous diseases, including even lichen and leprosy, also over cancer. It is administered in the form of decoction or of extract. The whole subject of the properties of this herb seems to demand fuller examination.

CLEF, a musical character placed on the staff, by which the names of the notes are fixed. There are three kinds of clefs—viz., the G, the C, and the F clef. The G clef is placed on the second line, the C clef on the third line, and the F clef on the fourth line. The C clef is a fifth below the G clef, and a fifth above the F clef. The C clef is also placed on the fourth line for some instruments; and in old vocal music, the C clef placed on the first line was used for the soprano.

CLEG, a name given to some insects of the dipterous family *Tabanidæ*, the females of which are extremely troublesome to horses, cattle, and human beings in summer, piercing their skins by means of a curious apparatus of small lancets with which the mouth is furnished, and drinking their blood. The name C. is sometimes given in England to *Chrysops cæcutiens*, a fly frequent in most parts of Europe, but rare in Scotland, and which not unfrequently inserts its proboscis through the sleeve, or some other part of the dress, and thus makes man himself the object of its attack. It is about one-third of an inch in length, mostly black, with yellow markings on the abdomen, and very large eyes of the most beautiful green and golden colors. The insect always called C. in Scotland, is *Hæmatopota pluvialis*—a rather smaller fly, mostly of a gray color, but also remarkable for its very large and beautiful eyes, which are greenish, with waved purplish-brown bands. In England, it is sometimes called the *Stout*.

CLE'MATIS (Gr. *clema*, the shoot of a vine), a genus of plants of the natural order *Ranunculaceæ*, having four colored sepals, no corolla, and for fruit numerous one-seeded achænia with long—generally feathery—awns. The species are pretty numerous, herbs or shrubs, generally with climbing stems, natives of very different climates, and much scattered over the world. They possess more or less active caustic properties. The long awns give the plants a beautiful appearance even in winter. The flowers of many species are also beautiful. *C. Vitalba*, the common TRAVELLER'S JOY (fancifully so named because of its ornamental appearance by the wayside), is the only native of Britain. It is common in the south, but becomes rarer towards the north, and is scarcely found in Scotland. The twigs are capable of being made into baskets. It rapidly covers walls or unsightly objects. The fruit and leaves are acrid and vesicant; the leaves are used as a rubefacient in rheumatism, and those of other species are also employed in the same way. A number of species are commonly cultivated in our gardens. *C. flammula*, a native of the south of Europe and north of Africa, with white flowers, which have a very strong honey-like smell, is the species known as Sweet Virgin's Bower.

CLE'MENS, Titus Flavius, a celebrated father of the Christian Church, was born probably at Athens, and resided during the greater part of his life in Alexandria, whence the epithet *Alexandrinus*. He flourished at the close of the 2d and the beginning of the 3d century. In his earlier years, he devoted himself with great zeal to the study of philosophy. His love of knowledge induced him to visit Greece, Italy, Syria, Palestine, and other countries. It is not known at what precise perio:

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he was converted from heathenism; but it is certain that after coming to Egypt, and listening to the prelections of Pantænus, he joined the Alexandrine Church, and was made a presbyter. Afterwards he became assistant to his master, who held the office of *catechist*. In 202 A.D., the persecution of the Christians under Severus compelled him to flee to Palestine. He is supposed to have returned to Alexandria about 206, and in 211 succeeded Pantænus. The year of his death is differently stated; some writers think it probable he died 213 A. D., others, as late as 220. His most distinguished pupil was Origen.

C. was a very fertile writer. The chief productions of his which have survived are the "Protrepticus," "Pædagogus," and "Stromata"—which together form one large work. The first is an exhortation to the heathen to abandon idolatry; the second, an exposition of Christian ethics; and the third, a collection of treatises and brief observations on Greek and Christian literature. They shew that C., when he became a Christian, did not cease to be a philosopher; instead of railing at science, he felt himself bound to make use of it, whenever it was helpful, in the elucidation of the higher questions of religion. Among the Fathers, "Biblical criticism," in the strict sense of the term, was unknown, and speculative philosophy was the only critical instrument in their possession. It is not to be wondered at, therefore, if much that is fantastic and absurd is to be found in their writings. C. certainly displays no lack of uncritical errors; but it is equally certain that the introduction of philosophy into Christianity helped to preserve the church from lapsing into the narrowness and ceremonialism of Jewish worship. The impression which we gather from C.'s writings, is that he was a man of broad, earnest sympathies, sincere piety, and liberal views in regard to the purposes of God's providence. This catholicity of mind procured him the accusation of heresy, and lost him the title of saint. C. was also a writer of Christian hymns, one of which addressed to the Redeemer, is preserved. His collective works were first published at Florence in 1550.

CLEMENS, or Clement, is the name of 17 popes, few of whom require any special notice. See POPES. CLEMENS ROMANUS, probably the C. mentioned in the Epistle to the Philippians, is assumed as the first of the series. He is accounted one of the apostolic fathers. He is said to have died as bishop of the church in Rome, in the year 102. Of his two "Epistles to the Corinthians," the first and longest is undoubtedly genuine. But the Apostolic Canons and Constitutions attributed to him are spurious, as well as the fabulous account of his journeys with the apostle Peter. This last has come down to us in two forms: one in Greek, divided into 19 Homilies, under the title of "Clementina;" the other, a Latin translation by Rufinus, entitled "Recognitiones Clementis." The Epistles have been edited by Muralt (Zurich, 1848), the Homilies by Schwegler (Stutt. 1847), and the Recognitiones by Gersdorf, in his "Biblioth. Patr. Eccl.," vol. i. (Leip. 1837).

CLEMENT XIV., Giovanni Vincenzo Antonio Ganganelli, was born in 1705 at St Arcangelo, near Rimini, where his father was a physician. At the age of 18, he entered the order of Minorites, and studied philosophy and theology, which he then successfully taught. His merits were appreciated by the keen-sighted Benedict XIV., who appointed him to the important post of counsellor to the Inquisition, and under Clement XIII. he was made a cardinal. On the death of Clement XIII., he succeeded to the papal chair, May 19, 1769. No pope had ever been elected under greater difficulties. The kings of Portugal, France, Spain, and Naples were at variance with C., chiefly on account of his support of the Jesuits; Venice wished to reform the religious orders without his interference; Poland was seeking to diminish his influence; the Romans themselves were discontented. C. first set about reconciling the monarchs; he sent a nuncio to Lisbon, suspended the bull "In Cœna Domini" and entered into negotiations with Spain and France. After several years of negotiation, he issued, 1773, the famous brief "Dominus ac Redemptor noster," suppressing "for ever" the society of the Jesuits. The motive assigned in the brief is, "regard to the peace of the church." From this time his life was made miserable by constant fear, and his strength gradually gave way. He died of a scorbutic disease, September 22, 1774. C. was remarkable for liberality of mind, address as a statesman, sound learning, and mildness of character. He cherished the arts and sciences, and was the founder of the Clementine Museum, which by the additions of Pius VI. and Pius VII., became the chief ornament of the Vatican

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CLEME'NTI, Muzio, one of the best of pianists and composers for the pianoforte, was born at Rome in 1750 or 1752. His skill on the pianoforte when only 13 years of age, secured for him the notice of a Mr. Beckford, an English gentleman travelling in Italy, with whom C. went to England, and in whose family he remained for several years, studying the works of the great composers, and where he also acquired an extensive knowledge of literature. His "Opera 2" (composed in his 18th year) is considered the model on which the whole modern pianoforte sonatas have been founded. After travelling on the continent for some time he retured to England, where he obtained the highest reputation as a teacher. Pecuniary misfortunes induced him in the year 1800 to commence business as a music seller and manufacturer of pianofortes. He died in London, March 10, 1832. His compositions, mostly pianoforte sonatas, are full of pleasant melody, and arranged in masterly style. For students, his classical "Introduction to Pianoforte Playing," and his last work, the "Gradus ad Parnassum," have been highly recommended. His style of playing was brilliant, and in improvisation he excelled all his predecessors.

CLEOME'DES, a Greek writer on astronomy. Nothing is known regarding his life, nor the period when he flourished. His treatise is entitled "The Circular Theory of the Heavenly Bodies," and is remarkable as containing, amid much error and ignorance, several truths of modern science—such as the spherical shape of the earth, the revolution of the moon about its axis, its revolution round the earth, &c. C.'s treatise was first printed in Latin by Geo. Valla (Ven. 1498); in Greek, by Conrad Neobarius (Par. 1539). The two latest editions are those of Janus Bake (Lugd. Bat. 1820) and C. C. T. Schmidt (Leip. 1832).

CLE'ON, a famous Athenian demagogue, who flourished during a part of the Peloponnesian war, was originally a tanner, but having a strong bias towards politics, he gradually abandoned his business, and became the champion of popular "rights." He first became prominent in the discussion regarding the fate of the Mytilenæan prisoners, 427 B. C. C. advocated the massacre of the males, carried his point, and more than 2000 perished; the rest were saved through the remorse of the Athenians. In 425 B.C., along with Demosthenes, he commanded an expedition against the island of Sphacteria, which was garrisoned by the Lacedemonians, and, much to the surprise of every one, succeeded in reducing the place; but the whole merit of this deed is usually attributed to his colleague. C. himself, however, was highly elated with his success, and his countrymen, or, at least, many of them appear to have fancied that he really possessed military genius, for in 422 B. C. he was sent to oppose Brasidas, the Spartan general, in Macedonia and Thrace. On his way thither, he took Torone, a town in which Brasidas had left a small garrison, and afterwards Galepsus. But the great design of the campaign was the capture of Amphipolis, where Brasidas was stationed. C. somewhat reluctantly advanced, and began to reconnoitre. While he was so doing, Brasidas made an unexpected sally, and in the battle which ensued both leaders were slain. The Athenian army, however, was defeated, and obliged to retreat. The general opinion of C. is not favorable. He is painted both by Thucydides and Aristophanes as an ignorant, vain, blustering, and cowardly *nouveau riche*. Most modern historians have accepted this estimate of the man; but Grote, in his "History of Greece," has thrown very considerable doubt on its truth, and has labored to shew that he was the rough but resolute champion of the people, and that his character has been vilified and abused by Aristophanes, who was—there can be no doubt—violently aristocratic.

CLEOPA'TRA, the daughter of the Egyptian king, Ptolemy Auletes, was born 69 B. C., and, according to the will of her father, should have inherited the throne along with her brother, Ptolemy Dionysus, who was also her husband. Her claim, however, being opposed, Julius Cæsar came to Alexandria, 48 B. C., to interpose in the quarrel, and in the Alexandrian War, Ptolemy Dionysus fell, and C. who was now married to her younger brother, Ptolemy, a boy of eleven years, was established upon the throne of Egypt. She bore a son to Cæsar, who was named Cæsarion. On her visiting Rome, Cæsar received her with great magnificence, and placed her statue in the temple which he had built to Venus Genitrix. In the civil war, after Cæsar's assassination, C. at first hesitated which side to take. After the battle of Philippi, Antony summoned her to appear before him at Tarsus, in Cilicia, to give account of her conduct. C., who had in the meantime got quit of the youthful Ptolemy by

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poison, appeared in the character of Venus Anadyomene, and so fascinated Anthony, that he ever afterwards remained devoted to her. They spent the winter, 41—40 B. C., in Alexandria, in revelry; and Anthony, although he had in the meantime married Octavia, the sister of Octavianus, returned to the embraces of C. who met him at Laodicea, in Syria, 36 B. C., and accompanied him to the Euphrates. His general residence from this time was with her at Alexandria. He bestowed upon her and upon her children great estates, which, however he had no right so to dispose of. Upon this and other accounts, he became the object of great detestation at Rome, and war was declared against C., Antony being now regarded as her general. At her instigation, he risked the great naval battle of Actium (q. v.); and when she fled with 60 ships, he forgot everything else, and hastened after her. When Octavianus appeared before Alexandria, C. entered into private negotiations with him for her own security, which treachery becoming known to Antony, he vowed revenge; but a report coming to him that she had committed suicide, he thought it impossible to survive her, and fell upon his sword. Mortally wounded, and learning that the report which he had heard was false, he caused himself to be carried into her presence, and died in her arms. Octavianus, by artifice, succeeded in making her his prisoner. Failing to make any impression upon him, and finding that he spared her life only that she might grace his triumph at Rome, she took poison, or, as is said, killed herself by causing an asp to bite her arm. Her death took place in August, 30 B. C. Her body was buried beside that of Antony, and Octavia brought up the children whom she had born to Antony as if they had been her own.

CLEPSY'DRA, an ancient Greek musical instrument, described by Athenæus as having pipes which were made to produce a soft sound by the agitation of water forcing air into them. There were levers for admitting the water, thus forming a kind of hydraulic organ.

CLEPSYDRA (Gr. *klepto*, I conceal, *hydor*, water), an instrument for measuring time by the efflux of water through a small orifice. Two kinds have been in use—one wherein the fluid is simply allowed to escape through the orifice; the other, in which the uniformity of the flow is secured by maintaining the fluid at a constant level in the instrument. The first would, like a sand-glass, give only an accurate measure of the time occupied in the escape of the whole fluid; of a shorter time, it would be an inaccurate measure, as the pressure under which the escape takes place at the commencement is greater than at any instant thereafter, and constantly diminishes with the height of the fluid column. In the second, the flow must be nearly uniform; and if the water be received into a uniform graduated tube as it escapes, we have a tolerably good clock. The rate of the flow, however, is affected by temperature and barometric pressure. The C. is supposed to have been used among the Chaldeans. The Romans employed it extensively. The invention of the pendulum has superseded it in modern times.

CLERC, Jean Le, better known as Johannes Clericus, was born at Geneva, March 29, 1657, where his father was a clergyman. From an early period, he shewed a particular aptitude for the study of ancient languages, and in this department he is still a conspicuous name. He also paid great attention to theolgoy, and his numerous controversial writings brought him no mean reputation during his lifetime. Before he was twenty, C. had imbibed heterodox opinions in religion. In 1678, he went as tutor to Grenoble, where he remained for two years; in 1680, he returned to Geneva, and was appointed to the clerical office. All the while, his objections to the accepted theology of the day had been growing; the works of Curcellæus and of Episcopius confirmed this antipathy, and now he appeared as Liberius de St Amore, the writer of eleven Letters against the Errors of the Scholastic Theologians—in short, as the partisan of the Dutch Remonstrants. In the latter part of 1681, C. left Saumur, whither he had gone to perfect his French, and went to Grenoble, and thence to London, where he preached six months to the Savoy congregation. Finally, he was appointed Professor of Philosophy, Classical Literature, and Hebrew at the Remonstrant seminary of Amsterdam. He died 8th January 1736. C.'s writings are very numerous; but his greatest service to posterity was the publication of a quarterly, the "Bibliothèque Universelle et Historique" (1686—1698, 25 vols., in 8vo), followed up by the "Bibliothèque Choisie" (1703—1713),

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and the "Bibliothèque Ancienne et Moderne" (1714—1727). Other works of C.'s are—"Harmonia Evangelica" (1700); "Traduction du Nouveau Testament avec des Notes" (1703); "Ars Critica" (3 vols., 1712—1730); and "Traité de l'Incrédulité" (1733). The first two are Socinian in their tendency. C.'s rationalism is still more manifest in a work entitled "Sentimens de quelques Théologiens de Hollande touchant l'Histoire Critique du Vieux Testament," in which the special inspiration of the Scriptures is denied. His editions of several of the ancient classics prove both his learning and acumen.

CLE'RGY (Gr. *cleros*, a lot, an inheritance), a term very generally applied to the ministers of the Christian religion, in contradistinction to the *Laity* (q. v.). This use of the term is very ancient, and appears to have gradually become prevalent as the ministers of religion more and more exclusively, instead of the members of the Christian Church equally, began to be regarded as God's "heritage," and "priesthood" (1 Pet. ii. 9, and v. 3), consecrated to him, and peculiarly his. The distinction between the C. and the laity became more marked through the multiplication of offices and titles among the C., the ascription to them of a place in the Christian Church similar to that of the priests and Levites in the Jewish Church, with peculiar rights and privileges, their assumption of a peculiar dress and of official insignia, the growth of monastic institutions, and the introduction of celibacy. In harmony with the notions on which this distinction is founded, is that of an indelible or almost indelible character derived from ordination, so that a renunciation of the clerical office is either viewed as an impossibility, or a sort of apostasy. These notions in their highest degree belong to the Church of Rome. In the Protestant churches the distinction between C. and laity is much less wide, and although the same terms are often used, it is rather conventionally than in their full signification. The employment of official robes by the C. preceded their assumption of a peculiar ordinary dress, and is not so intimately connected with any peculiar pretensions. Among the privileges accorded to the C. by the Roman emperors, and in the middle ages, was exemption from civil offices; among the rights asserted by them, and which caused much dispute, was exemption from lay-jurisdiction, even in cases of felony. The C. were distinguished into the *higher C.* and the *lower C.*, the latter including janitors, acolytes, lectors, exorcists, &c. The term *Secular C.* is the designation of priests of the Church of Rome who are not of any religious order, but have the care of parishes. Monks who are in holy orders are designated *Regular Clergy*. See BENEFIT OF CLERGY.

CLERK, Ship's, is a civil officer on board a ship of war, under the immediate orders of the captain. He keeps all the captain's documents, which are very numerous; such as the ship's log, remarks on coasts and anchorages, the muster-book, &c.

CLERK, John, of Eldin, Mid-Lothian, Scotland, inventor of the modern British system of breaking the enemy's line at sea, was the 6th son of Sir John Clerk of Penicuick, Bart. Though not a naval man, he studied deeply both the theory and practice of naval tactics, and in 1779 communicated to his friends a new manœuvre for "breaking the enemy's line" in a naval battle. Visiting London the following year, he had some conferences on the subject with naval officers, among whom was Sir Charles Douglas, Lord Rodney's captain of the fleet in the memorable action of April 12, 1782, when the experiment was tried for the first time, and a decisive victory gained over the French. The principle was adopted by all British admirals, and led to many signal naval victories. In 1782, C. printed 50 copies of his "Essay on Naval Tactics," for private distribution among his friends. It was reprinted and published in 1790; the 2d, 3d, and 4th parts were added in 1797; and the work was republished entire in 1804, with a preface explaining the origin of his discoveries. The manœuvre was claimed by Sir Howard Douglas for his father, Admiral Sir Charles Douglas, but C.'s right to it is indisputable. He died May 10, 1812—His son, John Clerk (Lord Eldin), an eminent Scottish judge, born in April 1757, was educated for the profession of the law, and in 1785, was admitted advocate. Distinguished for great clearness of perception and admirable powers of reasoning, he had for many years the largest practice at the Scottish bar, and in 1823 was raised to the bench, when he assumed the judicial title of Lord Eldin. He possessed a quaint sarcastic humor, and a course but ready wit, which, with his lameness and other bodily peculiarities, rendered him one of the most remarkable Edinburgh characters of his time. He died in that city in June 1832.

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CLERK, Parish, an official in the Church of England, who leads the responses in a congregation, and assists in the services of public worship, at funerals, &c., but is not in holy orders. There is usually one in each parish. In cathedrals and collegiate churches, there are several of these lay-clerks; and in some cases they form a corporate body, having a common estate, besides payments from the chapter. Before the Reformation the duties were always discharged by clergymen.

CLERK TO THE SIGNET. See WRITER TO THE SIGNET.

CLERMONT (in the middle ages, *Clarus Mons*, or *Clarimontium*) is the name of several towns in France. The most important is the capital of the department of Puy-de-Dôme, Clermont-Ferrand (the *Augustonemetum* of the Romans, in the country of the Arverni), which is finely situated on a gentle elevation between the rivers Bedat and Allier, at the foot of a range of extinct volcanoes, crowned by the peak of Puy-de-Dôme, about five miles distant from the town. It consists of the two towns of C. and Mont-ferrand, upwards of a mile distant from one another, and connected by a fine avenue of trees. C. contains several remarkable buildings: the old Gothic cathedral, the Corn and Linen Hall, the Theatre, and the Hôtel-dieu or Hospital. C. has several educational and scientific institutions, and a public library, in which are preserved some curious MSS. Pop. (1872) 29,070, who carry on the manufacture of linen, woollen cloth, hosiery, paper, &c., and an extensive traffic in the produce of the district, and in the transit trade between Paris and the south of France. There are two mineral springs in the town, which are used for bathing. That of St Alyre is most remarkable, having deposited in the course of ages an immense mass of limestone; and the deposit at one part forms over a rivulet a natural bridge 21 feet long. The whole district abounds in such springs. A multitude of Roman antiquities attest the Roman origin of the city. In the middle ages C. was the residence of the counts of the same name, and became the seat of one of the oldest bishoprics of France. Several ecclesiastical councils were held here, the most remarkable of which was that in 1095, at which the first Crusade was instituted by Urban II. A statue has been erected to Pascal, who was a native of Clermont.

CLERMONT-DE-LODEVE, a town in the department of Herault, 23 miles w.-n.-w. of Montpellier, agreeably situated on the declivity of a hill, crowned by the ruins of an old castle. It has extensive manufactures of woollen cloth. Pop. (1872) 6458.

CLE'RUS, a genus of insects of the order *Coleoptera*; section *Pentamera*, and of the great family or sub-section *Serricornes*. They are beautiful beetles, generally found on flowers, and often on those of umbelliferous plants, but their larvæ feed on the larvæ of different kinds of bees: those of *C. apiarius*—a rare insect in Britain, but common in some parts of Europe—on the larvæ of the hive-bee. It is about half an inch long, greenish, the wing-cases scarlet with purplish blue bands. How the larvæ of this and other insects should be able to carry on their ravages with impunity in a bee-hive, has never yet been satisfactorily explained.

CLE'VELAND (Cliff-land), a wild mountainous district, with some picturesque fertile valleys, forming the east part of the N. Riding of Yorkshire between Whitby and the Tees. Geologically, it consists of inferior oolite, but the coast and west border are formed of lias. In the south the hills rise 1300 to 1850 feet. An extraordinary change has been wrought in the aspect of the country by a rich discovery of ironstone in the C. hills; since 1851, lonely hamlets have become populous towns. The ironstone is chiefly an argillaceous carbonate, inferior in quality to the ironstone of the coal measures. See MIDDLESBOROUGH.

CLEVELAND, next to Cincinnati the most commercial city in Ohio, stands on the south shore of Lake Erie, at the mouth of the Cuyahoga, in lat. 41° 30′ n., and long. 81° 47′ w. The harbor is one of the best on the coast; and has been rendered still more available by extending a pier on either side into deeper water. By means of this secure and commodious haven, C., with the aid of artificial works in both directions, has navigable communications with the Atlantic Ocean on the one hand, and with the head of Lake Superior on the other; while to the south it connects itself with the basin of the Mississippi and the Gulf of Mexico through a canal which enters the Ohio at Portsmouth, about 200 miles below Pittsburg. C. is also the terminus of railways converging from almost every quarter. With so many advantages in its favor, it could hardly fail to grow and prosper. It is celebrated for its shipbuilding, and is becoming rapidly more and more important for its manufactures.

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Among these are copper-smelting, iron-rolling, coal-oil refining, the making of iron from ore, nail manufactories, &c. In 1874, the imports and exports were valued at 1,876,108 dollars. C. was founded in 1796, but it does not appear to have attained anything like its present rate of progress before 1840. Between that year and 1850, the population increased from 6071 to 17,034; in 1860, it was 43,147; in 1870, it was 92,829; and in 1880 it numbered 160,146. Many of the streets of C. are lined with trees, whence it is called "Forest City." C. has numerous public schools, colleges, public buildings, charitable institutions, 100 churches, 50 newspapers and periodicals, &c. Magnificent works were erected at the cost of about 800,000 dollars, to supply the city with water from Lake Erie.

CLEVES (Ger. *Kleve*), a town of Rhenish Prussia, 48 miles north-west of Düsseldorf. It is situated on three gentle elevations, about 2½ miles from the Rhine, with which it communicates by canal, in the midst of a rich and beautiful country. It is divided into an upper and a lower town, is well built, in the Dutch fashion, and surrounded by walls. It has a fine old castle, partly built on a commanding rock, in which Anne of Cleves, one of the wives of Henry VIII., was born, and which is now converted into public offices. In the collegiate church, which dates from the 14th c., are some good monuments to the counts of Cleves. C. has manufactures of woollen and cotton fabrics, silks, hosiery, tobacco, &c. Pop. 9038. C. was anciently the capital of a duchy extending along both banks of the Rhine, and which passed by marriage to the reigning House of Prussia.

CLEW is a name given to the lower corner of square sails, and the aftermost lower corner of stay-sails. *Clew-lines* are the names of ropes for managing these corners; *clew-garnets* are only applied to the *courses*, or largest sails of a ship: and to *clew-up*, is to haul up the C. of a sail.

CLEW BAY, an inlet of the Atlantic, on the west coast of Mayo county, Ireland, 15 miles deep by 8 broad. Some of the mountains on the north rise 1200 to 2500 feet, but the land on the east is lower, and leads to Westport, Newport, and Castlebar. Old red sandstone, carboniferous limestone, and Cambrian strata form the shores of the bay, which are generally bold and rocky, but have many small harbors and fishing-stations. The upper part of the bay contains an archipelago, 300 fertile and cultivated islets. At the entrance of the bay is Clare Isle, 4½ by 2 miles, composed of old red-sandstone and Cambrian rocks, and rising 1520 feet.

CLICHÉ (Fr.), the impression made by a die in melted tin or other fusible metal. It is the proof of a medallist's or die-sinker's work, by which they judge of the effect, and ascertain the stage of progress which they have reached before the die is hardened. The same term is applied by the French to stereotyped casts from wood-cuts.

CLICHY, a town of France, in the department of Seine, about four miles north-west of Paris, of which it forms a suburb. It has manufactures of white-lead and chemical products. Pop. 14,866.

CLI'CK-BEETLE, the popular name of many species of coleopterous insects of the tribe *Elaterides* (see ELATER), the parents of the destructive larvæ too well known to farmers by the name of WIRE-WORMS (q. v.). They derive the name C. from the sound which they make when, being laid on their back on any hard substance, they regain their feet by a spring, in the manner characteristic of the tribe to which they belong. The British species are numerous, the largest not quite half an inch long; none of them brilliantly colored; all very similar in form, rather elongated, and the thorax and abdomen nearly of equal breadth throughout. SKIP-JACK is another popular name for them. The Striped C. (*Agriotes* [*Cataphagus* or *Elater*] *pineatus*) is the parent of a very destructive kind of wire-worm.

CLI'ENT. See AGENT AND CLIENT. See also PRINCIPAL AND AGENT, PATRON, COUNSEL.

CLI'FTON, a beautiful and favorite watering-place in the south-west of Gloucestershire, forming the western suburb and part of the parliamentary borough of Bristol. It is built on the sides and top of a carboniferous limestone hill, 308 feet high; commands fine picturesque views; and is separated from a similar cliff by a deep chasm on the south, through which flows the navigable Avon. The rock

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abounds in fossils and quartz, or Bristol diamonds. It has a tepid spring of 78° F. which contains carbonic acid and salts of magnesia, and was brought into notice about 1695; but the former popularity of the spa has declined, and the pump-room has been destroyed. At the time of the great Lisbon earthquake, this water became red; and the Avon, which rises here 35 feet at high water, suddenly turned back. On Clifton Down are some remains of a Roman camp, 510 by 300 feet. An extensive camp is in good preservation on the opposite side of the gorge, with which C. is connected by a suspension bridge, 275 feet above low water, and 702 feet in span. C. college ranks among the best English schools. See BRISTOL.

CLIMA'CTERIC YEAR. It was long believed that certain years in the life of man had a peculiar significance to him, and were the critical points, as it were, of his health and fortunes. The mystical number 7 and its multiples (e. g., 35, 49) constituted crises of this kind. The most important of all was the 63d year, called, by way of eminence, the "climacteric year" or "grand climacteric," which was supposed to be fatal to most men; its influence being attributed to the fact, that it is the multiple of the two mystical numbers 7 and 9.

CLI'MATE (from the Greek *klima*, a slope or inclination afterwards applied to a tract of country, with reference to its supposed inclination to the pole, and the effect of the obliquity of the sun's rays upon the temperature), a term now employed as including not merely the conditions of a place or country with regard to temperature, but also its meteorological conditions generally, in so far as they exercise an influence on the animal and vegetable kingdoms. The effect of the sun's rays is greatest where they fall perpendicularly on the surface of the earth, and diminishes as their obliquity increases; the surface which receives any given amount of the sun's rays increasing with their increased obliquity, whilst at the same time the oblique rays being subjected to the influence of a greater number of particles of the atmosphere, a greater amount of their heat is absorbed before they reach the surface of the earth at all. The greater or smaller extent of surface receiving a certain amount of heat, also makes important differences to arise from *exposure* by slope towards the equator or towards the nearest pole. *Elevation* is a most important cause of differences of climate. As we ascend from the level of the sea to the greatest mountain altitudes, even at the equator, the temperature gradually diminishes, owing to the diminished density of the atmosphere, and we reach a region of perpetual snow, as in approaching the poles. The progressive diminution of the temperature is, however, affected by many other causes, so that the line of perpetual snow is far from being at the same elevation in all places of the same latitude. Thus, the snow-line on the southern side of the Himalaya is depressed by the moisture of the aërial currents from the Indian Ocean; and that on the northern side is elevated by the radiation of heat in the vast dry table-lands of Central Asia, and the consequent ascending streams of warm dry air; so that the difference between the two is not less than 4000 feet in favor of the *northern* side of the mountain-ranges; and Humboldt says, "millions of men of Tibetian origin occupy populous towns in a country where fields and towns would, during the whole year, have been buried in snow, if these table-lands had been less continuous and less extensive." As the actual temperature of the atmosphere depends not so much upon the direct rays of the sun as upon the radiation from the heated surface of the earth, the diversities in the character of that surface are productive of great effects in modifying climate. A sandy desert, a tract of country clothed with luxuriant vegetation, and an expanse of water, absorb and radiate heat in very different degrees. A newly ploughed field both absorbs and radiates heat much more rapidly than a field covered with grass. A sandy desert heats the atmosphere above it much more than either a fertile tract or a watery expanse, and a watery expanse still less than a fertile tract; but on the other hand, the desert cools sooner by radiation; whilst the heat absorbed by the water being diffused through a larger mass—partly by reason of the motion continually taking place in the fluid substance—and affecting greater depths, the influence of the ocean, of seas, and of great lakes, is very powerful in maintaining a greater equality in the temperature of the atmosphere. Thus maritime places, and particularly islands and peninsulas, have a more equal temperature, with less diversity of the extremes of summer and winter, than more inland or continental places otherwise similarly situated. The effect of the sea is modified by

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many circumstances, and particularly by currents, of which the Gulf Stream (q. v.) affords a notable instance, the heated water conveyed by it from the equatorial to the polar regions having a great influence on the C., particularly of the north-west of Europe. The temperature of Europe is also in part dependent on the warm south winds, which have absorbed heat from the great sandy deserts of Africa; and over the world generally, atmospheric currents must be regarded as exercising even a greater influence on C. than oceanic currents. The quantity of rain or snow that falls in the course of a year, and the times and manner of its falling, are circumstances which have a great effect on climate. These are circumstances much influenced by the distribution of land and water, and by the elevation and character of the surface of the land, which, doubtless, also influence electric and other meteorological conditions, less understood, but certainly not unimportant.

The relations of C. to vegetation are determined not merely by the mean annual temperature, but in a great measure also—and, with regard to many plants, entirely—by the duration and C. of summer. Thus, maize, which may be mentioned as an important example, succeeds well in climates of which the winter-cold is severe, the summer season alone being sufficient for its whole life; whilst, on the other hand, such plants as fuchsias, some kinds of laurel, and even the common hawthorn, which succeed well enough where maize would scarcely put forth an ear, would perish from the colder winters of countries where it is profitably cultivated. The polar limit of particular species of animals, except those which hybernate, is generally determined by the degree of winter-cold which they can bear without injury.

Bogs and marshes exercise an unfavorable influence on C., cooling the air and causing fogs, as clay-soils also to some extent do, through their retentiveness of moisture; whilst marshes of some kinds, and in some situations, abound in exhalations very unfavorable to health. Similar remarks apply to large tracts of forest. The clearing, drainage, and cultivation of land have generally favorable effects on C.; although plantations are often beneficial for shelter; and a too complete removal of natural forests may prevent the deposition of moisture from the atmosphere to such a degree as to cause droughts, a result strikingly exemplified in some of the smaller West India Islands, and the tendency to which is said to be manifested on the great scale in the eastern part of the continent of North America.

The important and difficult subject of C. will be found further elucidated in some of the principal geographical articles, and in the articles AGRICULTURE; ARBORICULTURE; ATMOSPHERE; METEOROLOGY; MONSOONS; RAIN; SEASONS; STORMS; TRADE-WINDS; WIND.

CLI'MAX, a Greek word signifying primarily a *stair*, and in Rhetoric, that artifice which consists in placing before the mind of the reader or hearer a series of propositions or objects so arranged that the least forcible strikes it first, and the others rise by successive gradations in impressiveness.

CLIMBERS (*Scansores*), in Ornithology, an order of birds generally characterized by having two toes before opposed by two toes behind, so as to adapt their feet in a remarkable degree for the purpose of grasping the branch of a tree or any similar object. Many have not two toes permanently directed backwards, but have the power of turning one of the front toes backwards at pleasure. Some have only three toes, but yet on other accounts are unhesitatingly ranked in this order. The families of the C., however, differ very much in many respects, although agreeing in the structure of their feet. To this order belong parrots, toucans, trogons, barbets, woodpeckers, and cuckoos. It has been objected to the name C., that although very descriptive of the habits of some birds of this order, as woodpeckers, it is not very applicable to others, as cuckoos, whilst there are birds of other orders, as creepers, which possess this habit in the greatest degree; and the name has been changed by some ornithologists into *Yoke-footed* or *Zygodactylous Birds*. It is generally the outer front toe which is directed backward in this order; but in the trogons, the first and second toes are opposed to the third and fourth.

CLIMBING PERCH (*Anabas scandens*), the only well-ascertained species of a genus of fishes, from which the family *Anabasidæ* (q. v.) derives its name. It is a native of rivers and ponds in most parts of the East Indies. It is about six inches long. In general form, it somewhat resembles a perch, and the resemblance is increased by the large scales and the spiny dorsal fin. That this fish climbs trees, has

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been asserted by observers whose veracity and accuracy cannot easily be questioned; yet others, who have enjoyed ample opportunity of observation, express great doubt concerning this habit. In climbing, the fish is said to suspend itself by its spiny gill-covers, and by fixing its anal fin in cavities of the bark, urging its way upwards by distending and contracting its body. There is no doubt that it often leaves pools when they are in danger of being dried up, and travels in search of water. Though these fish are sometimes compelled in their distress to travel by day, and have been met in the glare of noon toiling along a dusty road, their migrations are generally performed at night or in early morning, whilst the grass is still wet with dew. Climbing perches are plentiful in the Ganges, and the boatmen have been known to keep them for five or six days in an earthen pot without water, using daily what they wanted, and finding them as lively as when just caught.

CLIMBING PLANTS, or Climbers, are, in the most extensive and popular sense of the term, those plants which, having weak stems, seek support from other objects, chiefly from other plants, in order to ascend from the ground. This, however, is accomplished in very different ways. Some climb by means of small root-like processes growing from the stem, as the ivy; some by means of *cirri* or tendrils, which twine round branches of trees, &c. (see CIRRUS); some by adhering disks, of which a beautiful instance is to be seen in the well-known Virginian Creeper; and many by the twining of their own stems around those to which they cling. Twining plants generally turn only in one direction, either from right to left, or from left to right. The scarlet-runner and passion-flower are examples of the former; the honeysuckle and hop of the latter. Twining plants are not always included under the designation climbing plants. The woody twining plants, which form one of the most remarkable features of tropical forests, are often called *Lianas* (q. v.).

CLI'NCHER-BUILT, or CLINKER-BUILT, is a name applied in ship-building when the lower edges of the side planks overlap the row next under them, like slates on the roof of a house. If the planks are all smooth, meeting edge to edge, the construction is called *carvel-built*. This construction requires that the seams should be very close, and calked with oakum. Boats are often *diagonal-built;* two layers of planking, rising in opposite directions from the keel at an angle of 45°. In iron ships the clincher arrangement is called *lap-jointed*, and the carvel arrangement *jump-jointed*.

CLI'NIC BA'PTISM (Gr. *kline*, a bed), in the ancient church, baptism administered to a person on a sick bed or death bed. The practice and the term alike indicate notions concerning baptism which have no foundation in Scripture, and which, although once extremely prevalent, have now almost entirely disappeared.

CLINIC ME'DICINE, is that department of the art which is occupied with the investigation of diseases at the bedside, or individually.

CLI'NKSTONE, or PHO'NOLITE, is a grayish green felspathic rock, remarkable for its tendency to lamination, which is sometimes such that it affords tiles for roofing. It is a compact homogeneous rock, passing gradually into gray basalt. The slabs give a metallic ring or "clink" when struck with a hammer, whence its name. It occurs in volcanic districts.

CLINO'METER, an instrument for the purpose of taking the dip and strike of a stratum. It consists of a compass provided with a small spirit level, and on the lid —which can be fixed at right angles to the compass box—there is a small graduated quadrant and a plumb line.

CLI'NTON, De Witt, an American statesman of English origin, son of a major-general in the United States army, and descended on his mother's side, from the Dutch family of De Witt, was born in 1769, at Little Britain, state of New York. Being admitted to the bar, he became private secretary to his uncle, General George Clinton, till the end of his administration in 1795. In 1797, he was elected a member of the New York legislature, and in 1801, chosen a senator of the United States. Subsequently, he was elected mayor of New York, from which office the violence of political parties occasioned his retirement in 1815. Between 1817 and his death in 1828, he was repeatedly governor of New York state. The formation of the great canal from Lake Erie to the Hudson was mainly owing to his persevering endeavors.

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He was a member of most of the literary and scientific institutions of the United States, and of several of those of Great Britain and the continent of Europe. Besides various fugitive pieces, his productions consist of speeches, governor's messages, discourses before various institutions, addresses to the army, communications regarding Lake Erie Canal, and judicial opinions.

CLINTON, Henry Fynes, a very distinguished classical scholar, was born January 14, 1781, at Gamston, in Nottinghamshire; educated at Southwell School, and afterwards at Westminster. In 1799, he went to Oxford, and in 1805 took his degree of M.A. Next year, he entered parliament as member for Aldborough, which he continued to represent until 1826. He died October 24, 1852. C.'s two great works are the "Fasti Hellenici" (1824—1834), and "Fasti Romani" (1845—1850). They are known to all European scholars, and contain an immense store of learning.

CLI'O, in Grecian mythology, the daughter of Jupiter and Mnemosyne, the mother of Hyacinthus and Hymenæus. She was the Muse of History and Epic Poetry, and was represented as bearing a half-opened roll of a book.

CLIO, a genus of shell-less Pteropodous molluska, of which one species, *C. borealis*, is extremely abundant in the Arctic seas, and constitutes a principal part of the food of whales, so that indeed the name *whale's food* is often given to it by whale-fishers. It is scarcely an inch long; the head is furnished with six retractile tentacula; the organs of locomotion are two delicate fins, attached to the neck, and which in swimming are brought almost into contact, first above, then below. It is an active little creature, often coming for an instant to the surface of the water in calm weather, and then suddenly diving away into the depths. Myrakls are seen together, and the water is sometimes so full of them, that a whale cannot open its mouth without engulfing them in great numbers. *C. australis* is almost as abundant in the southern seas as *C. borealis* in the northern.

CLIPPER, is a name familiarly given to a ship built expressly for speed. The requirements of trades in which the merchandise carried was of a perishable nature, and rendered a quick passage desirable, were probably among the first causes which directed scientific attention to the *lines* of vessels for the purpose of ascertaining the form adapted to offer least resistance to the water. For many years the fruit-clippers have been celebrated for their rapid passages; and the opium-clippers, and slavers, have attained an unenviable notoriety for speed. The modifications of the old form of vessel have been gradual, the desideratum aimed at being the combination of the greatest carrying capacity with the form best adapted for speed. Perhaps the most successful improvements have been those of the Aberdeen builders, the Americans, and Mr Scott Russell. A C., as compared with an ordinary sailing-ship, is longer and narrower (though of late the tendency has been to increase the beam); very sharp at the bows, which are generally hollowed more or less below the water-line; gracefully fined away towards the stern, which is usually elliptical; and, altogether, presenting the contrast of the race-horse to the beast of burden. Some of the C. ships now running from Liverpool to America and to Australia are among the most magnificent vessels in the world. The *Lightning*, during a voyage from Melbourne to Liverpool, ran 2550 English miles in one week, or at the rate of 15⅛ miles an hour during the whole period. The Americans have fully done their part in introducing rapid C. ships, both for ocean and for river navigation, for steamers and for sailing-ships.

CLIPPING THE COIN. See COINING.

CLI'THEROE, a parliamentary and municipal borough in the west of Lancashire, on the left bank of the Ribble, 28 miles north of Manchester. It lies on a low eminence of carboniferous limestone, at the base of Pendle Hill, which is 1803 feet high. Pendle Forest is celebrated as the locality of the exploits of the Lancashire witches. The main street runs along the ridge of the eminence, and at its south end are the ruins of a castle, founded in the time of William Rufus by the Lacys. C. has print-works, cotton manufactures, and limekilns. It sends lime to all parts of the kingdom. About 5 miles west of C., lies Stonyhurst College, the principal seat of the Jesuits in England. Pop. (1871) of the parliamentary borough, 11,786. It returns one member to parliament.

CLIVE, Robert, Lord, Baron of Plassey, one of the greatest warrior statesmen of

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whom England can boast, the founder of British supremacy in India, was born at Styche, in Shropshire, 1725. At school he exhibited little aptitude for learning, but was noted for his mischievous propensities and his fearless disposition. The monotony of a clerkship in the India Civil Service at Madras, where he arrived in 1744, had literally nearly been the death of him; it was with great joy, therefore, that he abandoned the pen for the sword, when some three years after his arrival the troubles accumulating upon the English in India gave him an opportunity of doing so. C. had now found his true sphere. The bold, fearless character had now scope enough for its development; the intellect which, chained to the desk, had seemed of the dullest and most commonplace kind, in the freedom of the field became at once quick, comprehensive, and original. When C. grasped the sword, English influence in India was almost extinct; the French and their allies had scarcely left them even a material footing. Yet in less than half-a-dozen years after C. had, in August 1751, with 200 English infantry and 300 sepoys, marched out of Fort St David on his hazardous enterprise to attack Arcot, a city of 100,000 inhabitants, and garrisoned by 1200 or 1500 of Chunda Sahib's best troops, amply supplied with artillery, the decisive battle of Plassey had been fought, and English power established on the ruin of that of France and the native princes. The daring displayed in the capture of Arcot, and the intrepidity and fortitude exhibited in its defence by C. and his little band, reduced to 200 men, against an army of 10,000, was the foundation of England's subsequent greatness and glory in India. C.'s name henceforward was a tower of strength in India, where he was surnamed by the natives *Sabat Jung*, or "The Daring in War." Victory marched with him alike against native warriors, French, and Dutch. Unscrupulous as to his means, he would undoubtedly have found himself involved in many difficulties had not his questionable actions been invariably crowned, and thus—in the lax political notions of the time—justified, by success. Nothing remaining for him to do in India, he returned to England in 1760, and received the warm thanks of the Company and an Irish peerage from the government for his services. His wealth, arising from shares in various spoils, presents and grants of territory from native princes, was enormous. After his departure from India, the Company's affairs, through the dishonesty of its servants, high and low, fell into a state of the greatest confusion, and C., in 1764, was chosen to set them right. He proved himself as competent an administrator as he was a warrior. Uncompromising and resolute, he bore down every opposition to his plans, all the more sternly that he found it in some cases assuming the form of threats. In less than 18 months, he had "restored perfect order and discipline in both the civil and military services, and brought back prosperity to the well-nigh ruined finances of the Company." He returned to England in 1767, and was received with the distinction to which his important services entitled him. But the energetic way in which he had righted matters in India, gave offence to those who suffered from the suppression of dishonest practices, many of whom were not without considerable influence in the mother-country. This influence they employed to stir up ill-feeling against C.; and his proceedings in India were made the subject of animadversion in parliament in 1772, and in the following year, matter for the inquiry of a select parliamentary committee; who, however, failed to find that C. had acquired his great wealth by abuse of power, as his enemies had asserted. The form of acquittal, however, was not quite satisfactory to C., who never got over the disgrace implied in the trial; and ended his life by suicide, November 22, 1774.

CLŌA'CA. See the article BIRDS. A similar anatomical arrangement is found in one order of mammals, the monotremata (q. v.), in all reptiles, and in many fishes.

CLOACA MA'XIMA. This was a subterranean passage of vast extent, by which the whole, or a great part, of the filth of ancient Rome was conveyed to the Tiber. Drains from the lower parts of the city around the Forum, and from the other valleys, were commenced by Tarquinius Priscus; but the construction of the C. M. is attributed by Livy to Tarquinius Superbus. Niebuhr is of opinion, that it was at first intended to drain the valley of the Forum; but it appears to have been subsequently extended, and connected with the smaller cloacæ. Running from the Forum past the temple of Vesta, it terminated at the Tiber, where the mouth of it

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is still visible. It consisted of three large arches, one within the other. The space enclosed by the innermost vault was upwards of 13 feet in width, and of a corresponding height. The arches were built of large blocks of stone, fixed together without cement, of the uniform size of rather more than 5 feet 5 inches long and 3 feet high. The species of stone used bears evidence to the antiquity of the construction, being the material which was employed in the most ancient public edifices. The sewer was kept in a state of efficiency by a continual stream of superfluous water from the aqueducts. Large portions of this and of the other cloacæ remain, in some places still visible, but generally buried, by the accumulation of soil, at a considerable depth below the present level of the streets. During the Republic, the surveillance of the Roman cloacæ was one of the duties performed by the censors. The C. M. was subjected to repair by Cato and his colleague in the censorship. Agrippa, when ædile, obtained praise for his exertions in cleansing and repairing the cloacæ, and is recorded to have passed through them in a boat. Under the empire, officers called *curatores cloacarum urbis* were appointed for their supervision. So thoroughly was the city undermined by these large sewers, that Pliny calls it *urbs pensilis*, a city suspended in the air rather than resting upon the earth. Drains of the same description, but of smaller dimensions, existed in some others of the ancient Roman cities.

CLOCK BE'LL-METAL is principally an alloy of copper and tin, with smaller quantities of bismuth, antimony, lead, and zinc. A common alloy is 80 parts of copper, 10 tin, 5½ zinc, and 4½ lead. The bismuth and antimony make the bell more brittle, but they communicate a better tone; and where the proportion of tin rises as high as 20 per cent., or 1 part of tin to 4 of the other metals, a very much more sonorous bell is obtained.

CLOCKS and Watches. See HOROLOGY.

CLOG A'LMANAC, the name given in England to a primitive kind of calendar or almanac, called also a "rim stock" and "prime staff." In Scandinavia it was called a "Runic staff," from the Runic characters used in its numerical notation. It was generally of wood (whence its name of "clog," *i. e.*, log or block), but was sometimes of brass, of bone, or of horn. When of wood, it was most commonly of box; but elm, fir and oak, were also employed. "This almanac"—says Dr Plot, in his "Natural History of Staffordshire," written in 1686, when it was still in use among the common people of that county—"is usually a square piece of wood, containing three months on each of the four edges. The number of days in them are expressed by notches: the first day by a notch with a patulous stroke turned up from it, and every seventh by a large sized notch. Over against many of the notches are placed on the left hand several marks or symbols, denoting the golden number or cycle of the moon. The festivals are marked by symbols of the several saints issuing from the notches. Some are perfect, containing the dominical letters as well as the prime and marks for the feasts, engraven upon them, and such are our primestaves in the Museum at Oxford: others imperfect, having only the prime and the immovable feasts on them, and such are all those I met with in Staffordshire; which yet are of two kinds also, some public, of a larger size, which hang commonly here at one end of the mantle-tree of their chimneys, for the use of the whole family; and others private, of a smaller size, which they carry in their pockets." Examples of the C. A. may be seen in the British Museum (one cut apparently towards the end of the 17th c.); in the Ashmolean Museum, and the Bodleian Library, at Oxford; in St. John's College, Cambridge; and in the Cheetham Library, at Manchester. The Flemish antiquary, Gruter, delineates one at Rome, which he believes to have been used by the Goths and Vandals; but there is no reason to suppose that the C. A. was known to any European nation before its conversion to Christianity. It is described by the Swedish historian, Olaus Magnus, in the 16th c.; and by the Danish antiquary, Olaus Wormius, in the 17th c. It has been found in France and elsewhere. In Denmark it seems to have been generally flat, divided into six columns; but six-sided examples are not unfrequent. Some of the clog almanacs shew a peculiar numerical notation. The first four digits are marked by dots; the fifth by a sign like the Roman numeral V; the next four, by this sign and additional dots; and the tenth, by the sign +.

CLOGHKE'N, a town in the south-west of Tipperary county, 14 miles west-

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south-west of Clonmel, in lat. 52° 17′ n., and long. 7° 57′ w. Pop. (1871) 3176. The rich limestone soil of Tar vale produces fine wheat crops, and there are extensive flour-mills here. Six miles north-west of C. are the famous limestone caves of Mitchellstown, with beautiful limestone concretions. The caves consist of galleries and vaults, 800 by 570 feet.

CLO'GHER, a decayed episcopal city of Ireland, in the south of Tyrone, on the Launy, a tributary of the Blackwater, 104 miles north-north-west of Dublin. The see is now united to that of Armagh. St. Patrick is said to have been the first bishop of C. in 444. Pop. (1871) 1515.

CLOISTER (Fr. *cloître*, *claustrum*, an enclosure), a covered passage or ambulatory running round the walls of certain portions of monastic and collegiate buildings. The C. usually surrounded or ran along three sides of a quadrangular area, which was called the *C. garth*. The roof of the C., which was often vaulted, was supported on the side next to the quadrangle by pillars and arches, which were frequently ornamentally combined like trifoliat arches, and, like them, occupied by tracery. The upper portions of these arches above the mullions were often glazed; and sometimes latterly even the whole arches, so that they became a row of windows, as at Gloucester. Cloisters were used for exercise and recreation by the inmates of the religious houses. Occasionally, when wholly glazed, they had cells or stalls for study on the inner side, and very frequently a stone bench may still be seen which runs along the same side. Many of the larger monasteries had more cloisters than one, and so characteristic were they of the religious houses, that the term C. came to be used in a general sense for the whole establishment, which is still the sense of the word *kloster* in German. See MONASTERY.

CLONAKI'LTY, a town in the south of Cork county, Ireland, at the head of a small inlet, 26 miles south-west of Cork. Its chief export is grain. Pop. (1871) 3568.

CLONES, a market town of Ireland, in the county of Monaghan, 12 miles west from the town of that name. It is situated on a rising ground on the high-road between Monaghan and Belturbet, and near the Ulster Canal, and is in general well built, and has some ancient remains, including the ruins of a monastery, dating, it is said, from the 5th c., and of a round tower. It has manufactures of linen, corn-mills, and a brewery, and is the seat of a poor-law union. Pop. (1871) 2170.

CLONME'L (Vale of Honey), a parliamentary and municipal borough in the south of Tipperary county, with a little in Waterford, on both banks of the Suir, and two islands, 14 miles south-south-east of Cashel. It chiefly stands on the Tipperary side of the Suir, and on one of the isles in the river. One of the bridges over the Suir has 20 arches. The main street is a mile long, and parallel to the river. Pop. in 1871, 10,112, of whom 8729 are Roman Catholics, 1119 Protestant Episcopalians, and the rest of other denominations. C. returns one member to parliament. It has manufactures of cotton, and large flour-mills. The chief exports are agricultural produce and cattle. Barges of 20 to 50 tons ply on the Suir to Waterford. C. had formerly walls, of which one gate remains. In 1650, Cromwell besieged the town, and demolished the castle. C. gave birth to Sterne and Lady Blessington, and was the chief scene of O'Brien's attempted rising in 1848. Here Mr Bianconi first established the cheap and rapid car travelling over the south-west of Ireland; and C. is now a great centre for Irish tourists.

CLONTA'RF, a town of Ireland, in the county of Dublin, about 3 miles east-north-east of Dublin city. It is much frequented during the summer months for sea-bathing, and there are many handsome villas in the vicinity. C. is celebrated in history as the place where, in 1014, Brian Boroimhe (q. v.) won a great victory over the Danes. Pop. (1871) 3442.

CLOOTS, Jean Baptiste, Baron, better known as Anacharsis Cloots, was perhaps the most singular of all the enthusiasts brought to the surface of society by the French Revolution. He was born near Cleves in 1755, and from his 11th year was educated in Paris. Through ardent study of the ancients, his imagination, naturally extravagant, became so heated with the political constitutions of Greece, that he undertook the mission of spreading the democracy of Sparta and Athens through-

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ont the world; and with this view he travelled through most of the countries of Europe, under the name of Anacharsis, everywhere expending upon his philanthropic schemes large sums of his very considerable private fortune. The union of all nations in one family was the ultimate aim of all his cosmopolitan schemes. The breaking out of the French Revolution brought his enthusiasm to a head, as he saw in it the fulfilment of his dreams and plans. He returned to Paris, constituted himself the "orator or advocate of the human race," and presented numerous petitions to the National Assembly. On the 19th of June 1790, he appeared at the bar of the Assembly at the head of a number of strangers, dressed in the costumes of different nations, as the representatives of the whole earth, and presented an address of thanks for the stand made against the tyrants of the world, and a request that all the strangers then in Paris should be made French citizens. As a member of the Constituent Assembly, he offered to raise a Prussian corps, to be called the Vandal Legion; proposed to lay a price on the head of the Duke of Brunswick; called the king of Prussia the Sardanapalus of the north; and eulogized Count Ankarstrom for having assassinated the king of Sweden. What is singular is, that these extravagances were received often with storms of applause. He called for the apotheosis of Gutenberg in the Pantheon as the "creator of the world," and also for that of an apostate priest. On the occasion of the general armament of France, he deposited 12,000 francs on the altar of the country. In 1792 he was elected a member of the Convention, and continued to weary the house with his extravagant motions. He hated Christianity no less than royalty; declared himself the enemy of its founder; and as an adherent of the worship of Reason, preached downright materialism. At the trial of Louis XVI. he gave his vote for death "in the name of the human race," and took occasion at the same time to pass sentence on the king of Prussia. Some time after, on the motion of Robespierre, he was excluded from the Club of the Jacobins on the ground that he was wealthy and a nobleman. Robespierre hated and feared the enthusiast, and when St. Just brought his impeachment against Hebert and his adherents, C. was involved in it, was condemned to death, and executed March 28, 1794. He heard his sentence with the greatest composure, comforted the companions of his fate, and continued to preech materialism to his friend Hebert on the way to the place of execution. At the foot of the scaffold he requested that his turn might be last, in order that he might have time to establish a few more principles while the heads of the others were falling. He then laid his head with equanimity on the block, after asserting his innocence and protesting against his sentence "in the name of the human race." He left a number of writings, all of the same extravagant character, of which we may mention here "Certitude des Preuves du Mohammédisme" (Lond. 1780,) "L'Orateur du Genre Humain" (1791), and "Base Constitutionnelle de la Republique du Genre Humain" (1793).

CLOSE, in Heraldry. When the wings of a bird are down and close to the body, it is described as Close. The term is used only with reference to birds addicted to flight, such as the eagle, falcon, &c. Of dunghill cocks, and other domestic fowls, it is understood that their wings are in this position. Barnacles, and pits for horses, are said to be *close* when they are not to be understood as extended.

CLO'SE-HAULED, in Seamanship, is the mode in which the sails are arranged, in order to make the ship move in a direction the nearest possible towards that point of the compass from which the wind blows. Fore and aft vessels, especially cutters, sail closer to the wind than square-rigged ones. Ships of some sizes and shapes can attain this result better than others; but it is a quality scarcely to be calculated beforehand.

CLO'SET, in Heraldry, the half of the bar (q. v.).

CLOTAIRE I. and II., kings of the Franks. See MEROVINGIANS.

CLO'THES-MOTH, a name common to a number of species of small moths of the genus *Tinea*, the larvæ or caterpillars of which are extremely destructive to woollen clothes, furs, stuffed quadrupeds and birds, &c. *Tinea destructor* is one of the most annoying of these insect pests. It is of a satiny buff color, the wings deflexed when at rest. The larva is about a quarter of an inch long, with only a few hairs, white, with a slate-colored line down the back, an ochreous head, and

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16 legs. *T. tapezana* has the upper wings black at the base, the rest of the wing white. *T. sarcitella* is another very common species, of a silky gray color; the head, thorax, and base of the superior wings white; the wings folded flat on the back when at rest. The larva is covered with scattered hairs. These moths are most abundant in the warmer seasons of the year, but their larvæ carry on their destructive operations even during winter. Guided by instinct, the female moth lays her eggs where the larvæ may find their appropriate food, consisting, of substances indigestible to almost every other creature; and the larvæ, being furnished with minute but strong and sharp jaws, not only begin to eat as soon as they are hatched, but to cut the fibres of the substances on which they feed into little bits, and to unite them by means of a glutinous silk of their own producing, so as to form for themselves cases, lined internally with silk; and in these they constantly abide, adding to them at the anterior end as their own increase of size requires, and also widening them, by slitting them down the middle, and mending them with additional materials. All this may be beautifully observed by transferring the same moth-larva to different pieces of flannel in succession, of different colors. The larva of *Tinea tapezana* works its way through woollen stuffs in an arched gallery, carrying its little case with it. *T. pellionella* makes similar tunnels in furs *T. granella* is destructive to books as well as to grain. See CORN MOTH. The best means of preventing the ravages of moths are perfect cleanliness, frequent inspection of articles, and their exposure to light and air. Spirit of turpentine is used for killing them; the vapor arising from a sponge dipped in this liquid is fatal to such as it sufficiently reaches; they are also killed by the heat of a brisk fire or of an oven.

CLOTHING, Army, is one of the departments of the British military system into which, within recent years, much change and improvement have been introduced.

In the time of Henry VIII., the soldiers' dress was principally white, with green or russet for special corps. In Queen Elizabeth's reign, a sum of 1*s.* 8*d.* was allowed weekly for each soldier's clothing. The uniform then consisted of a cassock of Kentish broad-cloth, a canvas doublet, kersey stockings, trousers of kersey broad-cloth, neat's leather shoes, and holland shirts. In 1678, an infantry soldier's dress was valued at £2, 13*s.*, and a dragoon's as high as £6, 10*s.* At one time, lords-lieutenant attended to the C. of the troops, each in his own county; but the duty was afterwards transferred to the state. Captains of companies clothed the men, stopped the money out of the pay, and made a profit on the transaction. The privilege afterwards passed to the colonels of regiments. The sum provided by the state every year was for the "effective" strength of the regiment; and any vacancies put an additional sum into the pockets of the colonel. From 1746 to 1855, soldiers' pay was debited with "off-reckonings," as a means of paying for the clothes supplied to the men. Under this system, the colonel received from the state so much money annually for clothing his regiment, and then contracted with wholesale tailors for a supply on the lowest terms. In 1854, just before a change was made in the system, the colonel's profit, on the C. for a private in the line, was 15*s.* 3*d.* per man.

The disasters during the early months of the Crimean war having created a national demand for reforms in military matters, a change in the mode of army C. was one of the results. By a royal warrant, dated June 21, 1855, the colonels of regiments were awarded certain annual sums of money in lieu of off-reckonings. These sums varied from £1200 to £500, and were to be given in addition to the pay. From that date, all the troops have been clothed by the government, the off-reckonings being calculated nearly as before, but paid by the country to the colonels. When the War Office was remodelled about the same time, a clothing department was added to it; and it was now found that the C. for a full regiment of 1091 non-commissioned officers and rank and file, in the line, cost about £2500 per annum. The C. is now contracted for more openly than under the former system; and better materials are hence obtained without any increase in cost. The government has a factory on its own account, but a large part of the supply is obtained by contract. Formerly, soldiers' coats were too often made of very loose spongy materials; but now the inspection is rendered much more severe; and the cloth provided for privates is as good as that worn by sergeants a few years ago, while the cloth worn by sergeants now is correspondingly improved.

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The net amount of the parliamentary vote for army clothing in 1877-78 was $805,587 (of which a proportionate part is repaid by the Indian goverment). The cost of a suit of uniform varies from £2, 15s. 4d. for a private in the line, to £3. 15s. for a life-guardsman. The issue of new uniforms takes place on the 1st of April in each year. Under some circumstances, the men may receive money instead of C., at a certain price for each garment.

CLOTHING, Navy. The seamen of the royal navy are provided, while on the ship's books, with C. by the government; but a certain sum is subtracted from their pay, to defray the greater part of the cost. The navy estimates group "victuals and clothing" together. The total vote under this head for the year 1877—1878 amounted to £1,173,610, of which sum £344,742 was the amount allotted to thus provide clothing for the fleet, the coast-guard service, &c. Cast-off seamen's C. is among the "marine stores" sold by auction every year by the Admiralty. In 1859, when there was a strong desire to facilitate the manning of the navy, the Admiralty offered improved terms to sailors who would enter the royal service; and among other items, the following arrangements were made in reference to C.: "To every man on his first entering the navy for ten years' continuous service, and to all boys on being advanced to man's rating, a suit of clothes consisting of the following made-up articles to be furnished free of charge: A blue cloth jacket (No. 2 cloth), 17s. 8d.; a pair of blue cloth trousers, do., 11s. 7d.; a blue serge frock, 8s. 6d.; a duck frock, 2s. 9d.; a pair of duck trousers, 2s. 7d.; a black silk handkerchief, 2s. 10d.; and a pair of shoes, 6s. 7d. In the case of a seaman being already provided with clothes approved by his captain, a corresponding amount in money is to be placed to his credit." The above figures will about shew the market-value of the usual kinds of seamen's clothing.

CLO'THO, a genus of spiders, of which the only known species, *C. quinquemaculata*, a native of the south of Europe and north of Africa—about half an inch long, long-legged, brown, with black abdomen, marked with five yellowish spots—is interesting on account of its habits and the sort of tent which it spins for itself. This curious structure is in shape like a limpet shell, about an inch in diameter, and is fastened to the under side of stones or in crevices of rocks, not by its whole circumference, but by seven or eight points only. Within this the eggs are deposited in several bags of lenticular form. The parent creeps in and out under the edges of her tent, and supplies the young with food for some time.

CLOUD, St, a town of France, in the department of Seine-et-Oise, situated on the declivity of a hill near the Seine, 5 miles west of Paris. Its present name is said to be a corruption of St Clodoald, the name of a grandson of Clovis, who retreated to the little village of Novigentum, to escape the fury of his uncle, Clotaire, and became a monk. After his death, the village took the name of the pious prince, whose relics were sacredly preserved, and whose tomb was the scene of many miracles. St C. figures often in the wars of the middle ages. Henry III. was assassinated here in 1589, by the fanatical monk Jacques Clement. St C. was long famous on account of its magnificent château, built by Mazarin, and embellished by successive dukes of Orleans, who possessed it till 1782, when it passed into the hands of Marie Antoinette. Here Bonaparte, in 1799, was named First Consul; and in this place Charles X. signed the ordinances which produced the revolution of 1830. But during the siege of Paris, on the 13th October 1870, the château was set on fire and almost entirely destroyed by the French artillery from Mont Valerien; apparently because it was supposed to be the headquarters of the German staff. Pop. (1872) 2378.

CLOU'DBERRY (*Rubus Chamæmorus*), a plant of the same genus with the bramble, although of very different appearance, having a herbaceous single-flowered stem destitute of prickles. The plant is of humble growth, 8—10 inches in height; the leaves few, large, lobed, and somewhat kidney-shaped; the flower large and white, male and female flowers on separate plants, the female plant producing an orange-red fruit equal in size to a bramble-berry, and of an agreeable flavor. It is a native of the northern parts of Europe, Asia, and America. In Britain, it is chiefly confined to elevated moors; in Norway and Sweden, it is much more abundant, and the fruit is highly valued and made into excellent preserves. Unfortunately, the plant is of difficult cultivation, and no attempt to make it produce fruit

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freely in our gardens has yet been successful.—Somewhat similar to the C. is *Rubus geoides*, which yields a very agreeable fruit as large as a raspberry, one of the few native fruits of Terra del Fuego and the Falkland Islands.

CLOUDS are masses of fog, consisting of minute particles of water, often in a frozen state, floating in the atmosphere. When air saturated, or nearly so, with vapor, has its temperature lowered, either by ascending and becoming rarer, or by meeting a colder current, a portion of the vapor loses its gaseous form, and becomes condensed into minute specks of water. See EVAPORATION, DEW, RAIN, SNOW-LINE. A cloud, therefore, does not consist of vapor, in the proper sense of the word, but of water in the form of dust, as it were. How this water-dust is suspended in the atmosphere—why the particles do not descend as soon as formed, has never been satisfactorily explained. It has been assumed that the watery particles are hollow, like blown bubbles. But there is no proof of this; nor would the hollowness of the particles account for their floating, unless it could be shewn that they must be filled with a gas lighter than the surrounding air. Professor G. G. Stokes holds that they are prevented from falling mainly by the friction and drag of the air-particles, just as fine powders remain suspended in liquids of much less specific gravity than themselves. But, as Sir J. Herschel says, rising and horizontal air-currents must also oppose the fall of C.; for at night, in the absence of rising currents, they often descend to, and dissolve in lower and warmer levels. The conditions under which C. are formed, and afterwards deposited in rain, are more fully considered under EVAPORATION, DEW, RAIN, SNOW-LINE. The present article is confined to a description of the various kinds of C., and of the weather they indicate.

A general haze of precipitated vapor covering the sky, and coming down to the earth, is termed a *Fog* or *Mist*; and the term Cloud is usually confined to masses of fog floating in the higher regions, and not descending to the ground. They are mostly within a mile of the earth's surface; and none are more than five or six miles above it. They rise higher in the equatorial regions than towards the poles. C. spread and move with the wind in varied, often grand forms; they are generally disposed in beds parallel to the earth's surface; vertical C. occur rarely, if at all.

Mr Luke Howard's classification of C., proposed in 1802, into three primary forms—Cirrus (Ci.), Cumulus (Cu.), and Stratus (St.); three intermediate—Cirro-cumulus (Ci.-cu.), Cirro-stratus (Ci.-st.), and Cumulo-stratus (Cu.-st.); and one compound form, Nimbus (Ni.)—has been universally adopted, and holds good in all climates and atmospheric conditions.

Cirrus, or curl cloud, consists of parallel, curling, flexuous, diverging, and partly straight fibres, increasing in any or in all directions by elongation, branching, or addition of new fibres. It is the highest and least dense of C.; forms at least three miles above the earth; varies most in extent, direction, and shape; retains longest its varied outlines; and is the longest illuminated after sunset and before sunrise. It resembles a mare's or cat's tail, a lock of hair, fine trellis-work, or thin silvery streaks, and it may cover all the sky. Cirri seems to arise from the mixing of parallel air-currents, or are the relics of dissolving clouds drawn out in fibres by wind. Threads and groups of Ci., during gentle wind after severe weather, presage serene settled weather. But after a long tract of fair days, whitish filaments or parallel bands of Ci. crossing the sky, with the ends converging by perspective in each horizon, and travelling longitudinally, though seemingly stationary, foretell a change to wet. Ci., being so high, must consist of minute snow crystals, whose refractions and reflections produce the halos, coronæ, and mock suns and moons almost restricted to this cloud and its derivatives, the Ci.-st. and Ci.-cu. The fibres often wave back and froth, or to and from each other. Ci., especially with fine tails, varying much in a few hours, presage rain or snow, and windy variable weather.

Cumulus, ball of cotton, day or summer cloud, consists of dense, convex, hemispherical, or conical heaps of small roundish C., piled or stacked on each other. The heaps enlarge upwards from a horizontal base, and have crenated tops; they sometimes unite into stupendous white-topped mountains. It forms, says Sir J. Herschel, in summer calms by the rise of columns of vapor from marshes, lakes, and rivers, into the colder and quickly saturable lower regions of the air; for one liquid traverses another in cylinders. Cumuli begin after sunrise as a few scattered specks in the clear sky; these specks enlarge and unite to form C., which often nearly

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cover the sky in the afternoon, and generally decrease and vanish about sunset; but rain follows if they increase in number and darkness in the evening. Their tops become Ci. in very dry air. Cu., of pleasing forms, dispositions, and colors, and of moderate size, presage fine dry warm and calm days; but cold, rain, and tempest follow dark, abrupt, dense, shaggy Cu., covering the sky, and rolling on each other. Hemispherical, silvery white Cu. presage thunder.

Stratus, fall or night-cloud, the lowest of C., is a widely extended, horizontal sheet, of varied thickness, of white mist touching or near the earth. In density, it is between Ci. and Cu., and it increases from below. It is common in summer and autumn often from sunset to sunrise, and is densest at or after midnight. It arises in calm clear evenings, after warm days, from the cooling of moist air on damp ground, marshes, lakes, rivers, or from the cooling of moist air mixed with smoke enveloping great cities. From a height, it is seen spreading around like a sea, and creeping up hillsides. After sunrise, it rises from the ground, breaks up into Cu., and vanishes with the increasing heat, to be followed by a serene day; but it may quietly accumulate in layers, and became a Ni. It does not wet objects it touches, and thus differs from a variety of Ci.-st. of like external aspect.

Cirro-cumulus, or sonder-cloud, consists of Ci. sinking in the air, and compressed into dense roundish-white cloudlets, or woolly irregular tufts, generally at great heights. It often forms a beautiful sky in beds like flocks of sheep at rest. It is often seen through breaks in lower C. moving differently. It may vanish or pass into Ci. or Ci.-st. Solar and lunar coronæ appear in it. It occurs in warm dry weather, and between summer showers, and presages increased heat. Ci.-cu. very dense, round, and close, and with Cu.-st., presages a storm or thunder. In winter, it precedes a thaw and warm wet weather.

Cirro-stratus, or vane cloud, consists of long, thin, horizontal clouds, with bent, or undulated edges. It often resembles shoals of fish, or has a barred appearance—the mackerel backed sky. It alone, or with Ci.-cu., forebodes rain, snow, and storm. Waved Ci.-st. generally attends heat and thunder; it often forms an extended shallow bed or thin veil, through which the sun and moon shine faintly. This variety oftenest presents the finest solar and lunar halos, parhelias and parasolenes, and it is the surest prognostic of rain and snow.

Cumulo-stratus, or twain-cloud, is a Ci.-st. mixed with Cu. heaps, or a wide flat base surmounted by a bulky Cu., with fleecy protuberances or rocky and mountain masses. It resembles a thick-stemmed fungus, with a flat, anvil-shaped, or cirrose top. It is much denser than Cu., though the air is not dry enough to round off sharply its tops. It often forms vast banks of cloud, with overhanging masses. It is common towards night in dry windy weather, when it has a leaden hue. It generally arises from Cu. becoming denser, wider, and protruding in large irregular projections over the base. It tends to overspread the sky, and partly or wholly to became Ni., and fall in showers. Cu.-st. is intermediate between clouds indicating fair, and those indicating rough, rainy weather, and attends sudden atmospheric changes. Distinct Cu.-st. forms before thunder. Cu.-st. increases the grandeur of mountain scenery, and drops on and envelops mountain-tops like a curtain.

Nimbus, or Cumulo-cirro-stratus, the black rain-cloud, is a cloud or mixed system of clouds, ending in showers of rain, snow, or hail. It is a dense, continuous, horizontal black or gray sheet, with fringed edges, a cap of Ci., and Cu. on the sides and below. Before rain, vast towering masses of Cu. often pass into Cu.-st., which, increasing in density, darkness, irregularity, and extent, become Ni. capped by Ci.-st. Thunder-storms are always accompanied by Ni. in its most perfect form.

The term *scud* has been applied to loose vapory fragments of C. driven by wind, and *cumulonus* to shaggy cumuli.

The formation and height of C. vary with the quantity of vapor in the air, the course and height of air-currents, the climate, season, temperature, disposition, and extent of sea and land, and the height of land. Cloud-strata on the Pyrenees vary in average thickness from 1600 to 3400 feet. The lower surfaces of considerable masses of clouds in all climates are probably 2500 to 3000 feet above the earth. Remarkable cloud-rings prevail over the calm zones of the equator, and over those of Cancer and Capricorn. Clouds, viewed from above in bright sunshine by the aëronaut or mountaineer, appear as dense volumes of steam or masses of

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white cotton. Kaemtz regards the usual height of Ci. as 10,000 to 24,000 feet; Cu., 3000 to 10,000; Ni., 1500 to 5000; But Ci. may descend to 2000 or 3000 feet, and Ni. to within a few hundred feet of the earth.

C. moderate the sun's rays during day, and the earth's radiation during night. They always exhibit positive or negative electricity, but of greatest tension in thunder storms. They are the sources of the moisture required by plants; of the water of springs, lakes, and rivers; and of the polar, glacial, and winter snows, which cover temporarily or permanently parts of the earth.

In Britain, six or seven tenths of the sky is on an average daily obscured by clouds. There is most cloud in winter, and about mid-day, and least in May or June, and during night. Summer and autumn nights are freest of clouds. All the forms of C. may be seen in one day, often very much commingled.

CLOUDY BAY. See NEW ZEALAND.

CLOUTED or Clotted Cream is obtained by heating milk in a shallow wide pan on a hot plate or over a slow charcoal-fire. The milk must be strained as soon as it comes from the cow, into the pan, where it must stand for 24 hours before heating. It usually takes from half an hour to three-quarters of an hour to heat the milk completely; but it must not boil. It then stands for 24 hours, when the cream is skimmed off, and a little sugar thrown on the top. The result is C. C., which, mixed with new milk, is eaten with strawberries, raspberries, tarts, &c. Devonshire is famous for its clouted cream.

CLOVE BARK, another name for CULILAWAN BARK (q.v.).—Another bark which occurs in commerce under the name of C. B. is that of the *Myrtus caryophyllata*, a native of Ceylon and the Mascarene Isles. It is in sticks two feet long, formed of several pieces of very thin and hard bark, rolled up one over the other, of a deep brown color, and of a taste similar to that of cloves. It possesses properties analogous to those of cinnamon.

CLO'VER, or Tr'efoil (*Trifolium*), a genus of plants of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, containing a great number of species, natives chiefly of temperate climates, abounding most of all in Europe, and some of them very important in agriculture as affording pasturage and fodder for cattle. The name C. is indeed popularly extended to many plants not included in this genus, but belonging to the same natural order, and agreeing with it in having the leaves formed of three leaflets, particularly to those of them which are cultivated for the same purposes, and sometimes collectively receive from farmers the very incorrect designation of *artificial grasses*, in contradistinction to *natural grasses*, i. e., true grasses. See MEDICK and MELILOT. The true clovers (*Trifolium*) have herbaceous, not twining stems; roundish heads or oblong spikes of small flowers; the corolla remaining in a withered state till the ripening of the seed; the pod enclosed in the calyx; and containing one or two, rarely three or four seeds. About 17 species belong to the flora of Britain.—The most important of all to the British farmer is the COMMON RED C. (*T. pratense*), a native of Britain and of most parts of Europe, growing in meadows and pastures. It is a perennial, but is generally treated as if it were a biennial. Its heads of flowers are oval or nearly globular, very compact, about an inch in diameter, purple, more rarely flesh-colored or white; the tube of the calyx is downy; the stipules run suddenly into a bristly point. The leaflets have very often a whitish horseshoe mark in the centre. This plant was formerly reputed very noisome to witches; knights and peasants wore the leaf as a potent charm against their arts. It is supposed that C. found its way into England from the Netherlands about the time of Queen Elizabeth, but it was not until the close of last century that it was introduced into Scotland, where it is now universally prevalent. The ZIGZAZ C. (*T. Medium*), also called MEADOW C., MARL-GRASS, and COW-GRASS much resembles the Common Red C., but is easily distinguished by the smooth tube of the calyx, and by the broader, less membranaceous, and gradually acuminated stipules. The stems are also remarkably zigzag, and more rigid than in *T. pratense*; the heads of flowers are larger, more lax, more nearly globose, and of a deeper purple color; and the leaflets have no white spot. It is a common plant in Britain and most parts of Europe. WHITE or DUTCH C. (*T. repens*) is also a common native of Britain and of most parts of Europe. When a

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barren heath is turned up with the spade or plough. White C. almost always appears. It is said to be a native also of North America, where, however, it is perhaps only naturalised. The flowers of all kinds of C. are the delight of bees, but those of this species perhaps particularly so.—ALSIKE C. (*T. hybridum*), a perennial, regarded as intermediate in appearance between the Common Red C. and the White C., has of late attained a very high reputation. It was introduced into Britain from the south of Sweden rather more than twenty years ago.—CRIMSON C. or ITALIAN C. (*T. incarnatum*), an annual, native of the south of Europe, with oblong or cylindrical spikes of rich crimson flowers, is much cultivated in France and Italy, and has of late been pretty extensively grown in some parts of England, producing a heavy crop.—MOLINER'S C. (*T. Molineri*) very much resembles Crimson C., but is biennial, and has pale flowers. It is cultivated in France and Switzerland.—ALEXANDRIAN C., or EGYPTIAN C. (*T. Alexandrinum*), an annual species, a native of Egypt, universally cultivated in its native country, where it is the principal fodder for cattle, has been tried in Britain, but the colder climate has been found to render it less luxuriant and productive. It is supposed to be one of the best kinds of C. for many of the British colonies. It has oval heads of pale-yellow or whitish flowers.—YELLOW C., or HOP TREFOIL (*T. procumbens*), is very common in dry gravelly soils in Britain, but not much esteemed. It has smaller leaves and heads of flowers than any of the cultivated species. Its flowers are yellow.

It is little more than a century since clovers were introduced into field culture in Britain. They are now universally cultivated on large farms in alternation with grain crops. The kinds most generally sown are the *Common Red*, *Cow-grass*, *Dutch White*, *Yellow*, and *Alsike*. The *Common Red* is the finest and most valuable, but it is difficult to grow unless on naturally rich soils. In America it grows well on sandy loams, though sown every alternate year on the same land. But in Britain the land is thought to become "clover-sick" when sown too frequently with this crop. An interval of not less than eight years is thought advisable. From 6 to 20 lbs. of seed per acre is the quantity sown. Red C. is most esteemed for being mixed with rye-grass for the making of hay. When it grows well, it bears to be cut more than once in a year. *Cow-grass* much resembles the common Red Clover. It is coarser but hardier, and better suited for pasture, as it bears more herbage, and comes better up after being eaten close down by stock. *Dutch White C.* is only esteemed for pasture; it grows short and thick on the ground, but throws out fresh stems and flowers during the most of the growing season. In the south of England, it is sometimes sown with but little rye-grass seed along with it; in Scotland, as much as a bushel or a bushel and a half of rye-grass is mixed with it for pasture. *Yellow C.* is chiefly sown on ground where neither the white nor red grows freely. It is not sown so frequently as it probably ought to be, for it rises early in spring, and a mixture of it with other clovers forms good pasture on all grounds. *Alsike C.* has been recently introduced; it rises much higher than White C. and offers to be a useful addition to our pasture plants. Land must be thoroughly cleaned of perennial weeds before it is sown with C., as the land cannot be subjected to cultivation while it is under this plant: C., therefore, is always sown in the end of the rotation, or as near the fallow or turnip crop as possible. It is sown early in the spring among the winter-wheat, or with the barley crop, and slightly harrowed in: for the seeds being small are not difficult to bury. Farm-yard manure is as good as any for clovers. A well-manured soil greatly assists in keeping the plants from dying out in spring. Clovers, like grasses, play a most important part in restoring fertility to land which has been exhausted by grain-crops. Their leaves gather food—carbonic acid and ammonia—from the atmosphere, which they store up in their roots and stems; and these, on decomposing, afford food for cereals or other crops which are more dependent on a supply within the soil.

The caterpillars of a number of species of moth feed on the leaves of different kinds of C.; but the insects most injurious to C. crops are weevils of the genera *Apion* and *Sitona*. See CLOVER-WEEVIL and PEA-WEEVIL.

CLO'VER-WEE'VIL (*Apion*), a genus of small pear-shaped weevils (coleopterous insects, section *Tetramera*, family *Rhynchophora*), different species of which feed on the leaves, and their larvæ on the seeds of clover, some also on those of tares and other leguminous plants. Like the other weevils, the perfect insect has the head very much elongated into a sort of muzzle. *A. aprioans* often does much injury to

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fields of common red clover, particularly interfering with the production of seed. It lays its eggs among the flowers, and the little grubs eat their way through the calyx into the pod. It is of a bluish-black color, little more than a line long. *A. flavipes* is attached in like manner to white clover, and other species of clover have their particular weevils.

CLOVES (Fr. *clou*, a nail) are the flower-buds of the Clove-tree (*Caryophyllus aromaticus*). The genus to which this tree belongs is of the natural order *Myrtaceæ*; the calyx has a cylindrical tube and 4-cleft border; the corolla consists of four petals united by their tips; the stamens are in four clusters; and the fruit is an oblong dry berry with one or two cells and as many seeds. The clove-tree is from 15 to 40 feet high, with a beautiful pyramidal head. The leaves are large, ovate-oblong, acuminated at each end, evergreen: the flowers are small, but produced in great profusion in cymes. Leaves, flowers, and bark have an aromatic odor. The ripe fruit in shape resembles an olive, but is not quite so large; it is of a dark-red color; it sometimes appears in commerce in a dried state, under the curious name of *Mother Cloves*; it has an odor and flavor similar to C., but much weaker: the broken fruit-stalks are sometimes also used for the same purposes as C.; but the flower-buds themselves are the principal product of the tree. They are gathered, and are dried by exposure to the smoke of wood fires, and afterwards to the rays of the sun, or by the latter alone. When first gathered, they are reddish, but become of a deep-brown color. The unexpanded corolla forms a little round head at the end of the calyx tube, which is about half an inch long, and thus the appearance is not unlike that of a little nail, whence the name. The clove-tree is a native of the Moluccas, and the Amboyna C. are still esteemed the best; but the tree is now cultivated in Sumatra, Bourbon, Mauritius, and some parts of the West Indies, and will probably soon be common in many other tropical countries. The Dutch, in order to secure to their own colonists a monopoly of the trade in this spice, destroyed the trees in the other Molucca Islands, and confined the cultivation of them to the isle of Ternate. It is not deemed quite certain that C. are the *karyophyllon* of the ancient Greeks; but before the discovery of the Spice Islands, eastern merchants brought them from Arabia, Persia, and Egypt, to the harbors of the Mediterranean, from which the Venetians and Genoese diffused them over Europe.

The Wild Clove-tree of the West Indies is *Myrcia acris*. See MYRCIA.

The properties of C. depend chiefly on an essential oil. *Oil of C.*, which forms one-fifth or one-sixth of their whole weight. They are used for flavoring dessert dishes and articles of confectionery. They have a hot taste and a characteristic odor. The oil of C. is obtained by repeatedly distilling C. with water, when two oils pass over, one of which is lighter, and the other is heavier than water. The oil has a hot, acrid taste, is of a light yellow when pure, and brown red when not so carefully prepared. It has a well-known odor, and is soluble in ether, alcohol, and the fixed oils. It is useful in medicine to check nausea and griping, caused by the administration of purgatives. It is also employed in the scenting of soap, and by the distiller. *Tincture of C.* is obtained by treating C. with alcohol for several days, and then straining, or by a solution of the oil of C. in spirits of wine. It is added in medicine, to stomachic tonic, and purgative mixtures.

CLOVIS (old Ger. *Chlodwig*, i. e., "famous warrior;" modern Ger. *Ludwig*, Fr. *Louis*), king of the Franks, was born 465 A.D., and by the death of his father, Childeric, became king of the Salian Franks, whose capital was Tournay. His first achievement was the overthrow of the Gallo-Romans under Syagrius, near Soissons. He then took possession of the whole country between the Somme and the Loire, and established himself in Soissons. In 493 he married Clotilda, daughter of a Burgundian prince. His wife was a Christian, and earnestly desired the conversion of her husband, who, like most of the Franks, was still a heathen. In a great battle with the Alemanni at Tolbiac, near Cologne, C. was hard pressed, and as a last resource, invoked the God of Clotilda, offering to become a Christian on condition of obtaining the victory. The Alemanni were routed, and on Christmas Day of the same year, C. and several thousands of his army were christened by Remigius, Bishop of Rheims. Most of the Western Christian princes were Arians, but C. was strictly orthodox, and in consequence was saluted by Pope Anastasius as the "Most Christian King." In 507, love of conquest concurring with zeal for the orthodox

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faith, C. marched to the southwest of Gaul against the heretic Visigoth, Alaric II., whom he defeated and slew at Vouglé, near Poitiers, taking possession of the whole country as far as Bordeaux and Toulouse; but was checked at Arles in 507 by Theodoric, king of the Ostrogoths. C. now took up his residence in Paris, where he died in 511. His great aim was the subjugation of all the Frankish princes, and the union of the whole Frankish people into a single powerful kingdom. The means he employed to secure this end were cruel and unscrupulous, but the end itself would have been very beneficial if he had not frustrated it at his death by re-dividing the newly organised realm among his four sons, and exposing it to the very perils from which he himself had rescued it.

CLOYNE, an ancient episcopal town, in the s.-e. of Cork county, 15 miles e. by s. of Cork. The see was founded in the 6th c. by St. Colman, the abbey in 707, and the cathedral in the 13th century. Near the cathedral is a round tower, 92 feet high. About 1480, the see was united to that of Cork, separated in 1678, and reunited in 1835. There are valuable marble quarries near. Berkeley was born here, and was bishop of C. in 1678. Brinkley the astronomer was also Bishop of Cloyne. Pop. in 1861 was 1713, but in 1871 had fallen below 1500.

CLUB. The word is probably allied to *cleave* (Ger. *kleben*), "to adhere," so as to form one body or mass. Among other significations, it is used to mean a company or association met for some common purpose, whether of hilarity, literature, politics, or economy. C., in its usual English acceptation, means a body of persons meeting for social or recreative purposes, and consisting of members belonging for the most part to some one class or occupation. Occasionally, other meanings are given to the word. Societies for political objects are sometimes called clubs; and *Benefit Clubs* are another name for *Benefit Societies*. What is known as club-life, as exhibited in London, had its origin in the days of Elizabeth, when the Mermaid Tavern, in Fleet street, enlivened by the wit and wisdom of Shakespeare, Raleigh, Ben Jonson, Beaumont, and Fletcher, became the home of a sort of club. Ben Jonson afterwards founded a second C. at the Devil Tavern, in the same street. Such clubs were meetings for social recreation, to which all were welcome who could bring wit and humor with them. In subsequent reigns, meetings of a similar racy character were very frequently held in taverns, but without much club formality. In last century, Brooks's and White's clubs, and a few others named after the proprietors of the houses in which the meetings were held, were established by politicians of opposite parties, as the head-quarters for parliamentary tactics.

The modern clubs of London, in which the *restaurant* or dining-room is an important feature, arose after the termination of the great war in 1815. Many naval and military officers, being no longer needed for war, were placed upon half-pay; and this half-pay was insufficient to support them without careful economy. If they could dine together at a C., it would be cheaper than if each maintained a separate establishment. Hence originated the United Service C.; and the success of this speedily led to the founding of others for different classes of society, and for persons of different political opinions. At the present time, there are about 100 such clubs in the metropolis, of which the following may be named: Alpine, Army and Navy, Arthur's, Athenæum, Brooks's, Carlton, Civil and Military, Conservative, East India United Service, Garrick, Guards', Junior Carlton, Junior United Service, Naval and Military, New University, Oriental, Oxford and Cambridge, Reform, Travellers', Union, United Service, United University, White's, Whitehall, and Windham's. All these, and some of the others, combine the *tavern* system with the *club* system. There are also about 20 working-men's clubs. Clubs are not confined to the metropolis.

Each principal C. comprises a certain definite number of members; it may be, for instance, 500, 1000, or 1500, and this number cannot be exceeded without a formal change in the rules. In some clubs, the managing committee are empowered to admit distinguished persons to membership; but the general mode of admission is by ballot, each member having a vote. In some clubs, one single black ball or "No" suffices to exclude a candidate; but, generally, the rules are not so stringent. The members pay a sum of money on entrance, and then an annual subscription—the amounts varying much in different clubs. The entrance money may be required as capital, to assist in building the club-house, &c.; while the annual subscriptions, af-

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ter paying current expenses, leave a surplus for future contingencies. The more important clubs comprise morning or news rooms, libraries, dining-rooms, drawing-rooms, and a very complete culinary establishment. There are no arrangements for the members to sleep at the club-houses; except at certain establishments called club-chambers, which, however, are not properly clubs. Some of the clubs are furnished with bath-rooms, card-rooms, billiard rooms, and smoking-rooms. The *restaurant* department is usually very complete; everything is of the best, and is supplied to members as nearly as can be at prime cost. In nearly all the clubs, hard-drinking is discouraged. It has been ascertained at two or three of them, that the average cost of dinners is about half-a-crown, and that the wine scarcely exceeds half a pint to each diner.

It may here briefly be mentioned, that some of the club-houses rank among the most elegant modern buildings in London. The Carlton, the Reform, the Conservative, and the Army and Navy club-houses are especially to be named in this respect.

Before the first Revolution, it was attempted to get up political clubs in Paris on the English plan, but they were prohibited by the police. With the meeting of the National Assembly, and the outbreak of the Revolution, political societies, about 1789, sprang into unwonted activity. These associations mostly assumed the English name—such as the Club des Feuillans and the Jacobin Club; but they had quite a different character: they were popular societies. In them were concentrated the great political parties of the nation, by means of systematic organisation and affiliation. The Jacobin Club thus came in the end to embrace all France, and to rule it. Similar associations sprang up in Germany, Italy, Spain, and wherever the Revolution took any root. In Germany, these unions were prohibited in 1793 by a law of the empire; and the prohibition of all political unions and meetings was renewed in 1832 by an act of the Germanic Confederation. The suppression of the clubs in France followed the extinction of the Revolution, and their place has since been taken by secret societies. After the revolution of 1848, clubs revived in great force in Italy and Germany, after the style of the first French Revolution, but speedily came to an end along with that which had given them birth.

CLUBBING, in cabbages, turnips, and other plants of the genus *Brassica*, a diseased growth of tubercular excrescences in the upper part of the root or lower part of the stem, caused by the larvæ of the Cabbage Fly (q. v.), and of other insects, by which the vigorous growth of the plant is prevented, and crops are often much injured. It is common for gardeners to cut away these excrescenses, with their contained larvæ, in planting out young cabbages, &c.; and where they are not so numerous that the injury done by the knife is necessarily great, this plan succeeds very well. Dressings of quicklime, wood-ashes, &c., have been recommended, and appear to have proved partially successful in preventing this evil, probably by deterring the parent insect from approaching to lay her eggs; but change of crop, when practicable, is of all things the most commendable. C. is sometimes confounded with Anbury (q. v.), from which it is quite distinct.

CLU'B-FOOT (Lat. *talipes*) is a distortion or twisting of the foot by one or more of its muscles being permanently shortened. It may exist from birth, or occur in early childhood after convulsive fits. Surgeons recognise four varieties of C.; turning inwards (*varus*), outwards (*vulgus*), downwards with elevation of the heel (*equinus*), or upwards with depression of the heel (*calcaneus*).

As age advances, the bones alter in form from the pressure exerted upon them, the ligaments shorten, and the foot becomes rigidly moulded in its unnatural position. It cripples the person's movements, and in many instances has proved a great affliction. Lord Byron's whole life seems to have been embittered by one of his feet being inverted.

Although Lorenz, in 1784, cut the tendo Achillis to lower the heel in talipes equinus, yet, owing chiefly to the dangers of cutting across tendons, C. was practically incurable till 1831, when Dr Little of London, having himself a C., after seeking relief from many surgeons at home and abroad, found his way to Dr Stromeyer, at Erlangen. This ingenious surgeon introduced a narrow-bladed knife, and divided the tendons of the contracted muscles with such a small external wound that scarcely any inflammation resulted. Dr Little being cured, published a treatise on

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the subject, and at the present day no deformity of the foot is considered irremediable. However, it must be remembered that the division of tendons must be followed by judicious manipulations, and generally by the application of some suitable apparatus to prevent the foot returning to its former position. Of such apparatus, Scarpa's Shoe, as it is termed, may be mentioned as the one most frequently in use.

CLU'B-MOSS. See LYCOPODIACEÆ.

CLU'B-RUSH. See SCIRPUS.

CLUNCH, a name given locally by miners to any tough indurated clay, such as is sometimes found in the coal-measures, or in the newer strata. The term has also been applied to the lower and harder beds of the cretaceous rocks, which are sometimes used for the stone-work of the interior of ecclesiastical buildings.

CLUPEIDÆ, an important family of Malacopterous (q. v.) fishes, nearly allied to the *Salmonidæ*, and differing from them chiefly in the want of an adipose fin. They are all scaly fishes, but the scales are very easily detached. None of the fins have any spinous rays. The ventral fins are nearly in the middle of the body. The dorsal fin is always solitary. The gill openings are very large. The teeth are small, and generally numerous. The maxillary bones are composed of three pieces easily separated. The body is generally elongated, and much compressed; the belly thin and almost reduced to a sharp edge, frequently denticulated by the edges or points of a series of small bones attached to the skin. The air-bladder is always large; the roe consists of a vast number of eggs. The fishes of this family are almost exclusively marine, only a few of them ascending rivers. They generally congregate in shoals, and some of them periodically visit certain coasts in vast multitudes. They are very widely diffused over the world; some of the particular species have a wide geographic range. To this family belong the Herring, Pilchard, Sprat, (Garvie, Kilkie), Anchovy, Sardine, White-bait, &c. See these articles. The Herring may be regarded as the type of the order, and of the genus *Clupea*. But the genera most important in an economical point of view have been very differently distinguished by different ichthyologists.

CLUPESO'CIDÆ, a family of Malacopterous fishes, so named from being regarded as exhibiting characters intermediate between those of the *Clupeidæ* (Herring, &c.) and of the *Esocidæ* (Pike, &c.). Some of them are marine, and some are fresh-water fishes. They are mostly tropical; none are British. To this family belongs the interesting genus *Arapaima* (q. v.), and the genera *Heterotis* and *Butirinus*, containing fishes of very curious structure and appearance, highly prized for the table.

CLU'SIA (named in honor of the great botanist L'Ecluse or Clusius), a genus of tropical trees and shrubs of the natural order *Guttiferæ* (q. v.) or *Clusiaceæ*, some of which are commonly called Balsam trees, from their resinous or balsamic products. They are very often *epiphytes*, growing on larger trees, over the bark of which their roots spread in search of chinks or decayed parts where they may obtain nourishment; and if it cannot be obtained in sufficient quantity, a root is sometimes sent straight down to the ground, and in due time becomes a kind of stem. The fruit is very curious, a sub-globular capsule, with a number of cells, opening as by meridian lines from top to base. *C. rosea*, a native of the West Indies and tropical parts of America, yields an abundant resin, which is used as an external application in veterinary medicine, and for covering boats instead of pitch. A great quantity of resin exudes from the disk of the flowers of *C. insignis*, the WAX-FLOWER of Demerara, which is used to make a gently stimulating and soothing plaster. This is one of the productions of Demerara, to which the colonists, in preparation for the "Great Exhibition" (of 1862), sought to draw general attention.

CLUSO'NÉ a town of Lombardy, Northern Italy, situated near the left bank of the Serio, 17 miles north-east of Bergamo. It has manufactures of linen, a trade in corn and iron, and in the neighborhood are vitriol works and copper foundries. Pop. 3000.

CLU'STERED CO'LUMNS, or, as they are sometimes called, Compound Piers, form one of the richest features in Gothic ecclesiastical architecture. The columns or shafts are sometimes attached to each other throughout their whole length, sometimes only at the base and capital. When surrounded by floriated fillets, they

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have been very aptly compared by Sir Walter Scott to "bundles of lances that garlands have bound."

CLWYD, a river of North Wales, rises in the Bronbanog Hills, in the south-west of Denbighshire, and runs 30 miles, first south, then east-north-east, and lastly north, through Denbigh and Flint shires, past Ruthin, St Asaph, and Rhuddlan, into the Irish Sea. Below Ruthin, and between barren hills, lies the fertile, populous, and level vale of the C., 15 by 5 to 7 miles. At St Asaph, the C. receives the Elwy, 20 miles long from the west, and increases much in size. It then enters the fertile and extensive marsh of Rhuddlan, and falls into the sea by a small estuary. It is navigable for vessels of 70 tons up to Rhuddlan, a distance of two miles from its mouth.

CLYDE, a river in the south of Scotland, the only great British river, besides the Severn, flowing west. Commercially it is the most important river in Scotland, and the romantic beauty of its scenery is widely celebrated. It rises by several large streams in the semicircular range of the Lead, Lowther, and Moffat Hills, and drains the shires of Lanark, Renfrew, and Dumbarton. The main and southmost source, the Daer, runs north, and receives the Powtrail. The Clyde (a smaller stream, after junction with which, the main stream is called the C.), and other streams, preserving its mountain character to Roberton, upwards of 20 miles below the source of the Daer. The C. then bends round Tinto Hill towards Biggar,* from whence it flows north-west, west, and south-west, to about 4 miles above Lanark, thence pursuing a north-west course through Lanarkshire, and between Dumbarton and Renfrew shires, past Lanark, Hamilton, Glasgow, Renfrew, and Dumbarton, near which town it opens into the Firth of Clyde. In this course, it receives a number of streams, and flows through a rich, fertile, wooded valley, often extending into level plains, and often with bold wooded banks. From 2 miles above to 4 miles below Lanark occur the celebrated Falls of the C., a series of cascades and rapids, the largest in Scotland for quantity of water—the total descent, in the course of six miles, being 230 feet over old red sandstone rocks amid very picturesque scenery. Two of the Falls are above, and two below Lanark. Bonniton Linn, two miles above Lanark, is a cascade of 30 feet, with some parts only 4 feet broad. Corra Linn, half a mile below the last, is the grandest fall, forming three distinct leaps—in all 84 feet high. Dundaf Fall is 10 feet high. Stonebyres Linn, two miles below Corra Linn, forms three distinct falls—in all 70 feet. Below Glasgow, the C. expands into an estuary, navigable by the largest vessels, and at Greenock it attains a breadth of about 4 miles. Opposite this point it communicates with the Gareloch, and a little below, with Loch Long on the north. Its course, which from Glasgow has been west-north-west, now turns suddenly south, in which direction, inclining a little to the west, it continues to flow between Argyle and Bute, and Cantire on the west, and Renfrew and Ayr shires on the east, until it becomes identified with the North Channel at Ailsa Craig, where its breadth is about 30 miles. The C. from its source to Glasgow is, by its windings, 75 miles long, and from Glasgow to the south end of Cantire, 48 miles. Its basin occupies 1500 square miles, and consists of carboniferous strata and trap rocks, the latter chiefly forming the bordering mountains. Floods sometimes raise its waters 20 feet, and it has changed its course at Renfrew, which was once close to it. Clydesdale, or the valley of the C., is noted for its coal and iron mines, orchards, and horses. Bell, in 1812, launched on the C. the first boat in Europe successfully propelled by steam.

CLYDE, LORD. See CAMPBELL, SIR COLIN.

CLY'STER (Gr., from *klyzo*, I wash out), called also *enema*, a medicine administered in the liquid form by the rectum, or lower end of the intestine. It is used either for the purpose of procuring evacuation of the bowels, or of conveying stimulating or nourishing substances into the system. For the latter purpose, wine and beef-tea, or milk in quantities of a few ounces at a time, are employed; for the former, simple warm or cold water in sufficiently large quantity to distend the bowels, and produce evacuation; or in special cases, various cathartics may be used in addition, such as colocynths, aloes, castor oil, or turpentine made into an emulsion

* In very high floods, the waters of the Clyde sometimes overflow in the boggy ground there, and a portion runs into the Biggar Water, and so into the Tweed.

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with yolk of egg, and sometimes carminatives, to expel air. Narcotic clysters are also employed, but should only be used under medical superintendence. An injecting syringe, with a flexible tube, and a double-action valve, is usually employed for the administration of this remedy.

CLYTEMNE'STRA, in Homeric legend, the daughter of King Tyndareus and of Leda, and the twin-sister of Helena, became the wife of Agamemnon, and bore him a son, Orestes, and two daughters, Iphigenia and Electra. During the absence of Agamemnon on his expedition to Troy, she formed a connection with Ægisthus, murdered her husband on his return, and reigned for seven years with Ægisthus, till she was murdered by her own son, Orestes.

CNI'DUS, or Gnidos, a city on the promontory of Triopion (now Cape Krio), in Caria, in Asia Minor, a Lacedæmonian colony, and one of the six cities of the Doric league. C. (according to Strabo) had two ports, one of which could be closed. In front of what was the town, lies a lofty island, about 600 yards long, which was connected with the mainland by a causeway (now a sandy isthmus). The southern port was formed by two moles, carried into the sea to the depth of nearly 100 feet, one of which is nearly perfect at the present day. The city was famous for several temples of Venus, who was therefore sometimes called the Cnidian goddess. One of these temples contained the famous statue of the naked Venus by Praxiteles. It was of Parian marble, and so beautiful, that Nicomedes, king of Bithynia, offered, in return for this master-piece of Grecian sculpture, to pay the entire debt of the city, which was very large. The Cnidians, in the excess of their devotion to art, refused. During the wars in ancient times, C. was often mercilessly plundered. The site of the city is "covered with ruins."

COACH is a general name for a vehicle drawn by horses, designed for the conveyance of passengers, as distinguished from a wagon or cart, for the conveyance of goods. Coaches, or enclosed carriages, drawn on wheels, and intended for passengers, were inventions which have been claimed by Hungary, England, Italy, France, Spain and Germany. The name is derived by Wedgwood, from Fr. *coucher*, to lie, which becomes in Dutch *koetsen*, whence *koetse* or *koets-wagen*, a litter or carriage in which you may recline. The earliest record found by Beckmann relates to about the year 1280, when Charles of Anjou entered Naples, and his queen rode in a *caretta*—apparently a small but highly decorated car, from which the modern *charet* or *chariot* was derived, as well as other vehicles named *chares* and *charettes*. It is believed that most of these vehicles had broad wheels, the only form suited for the wretched roads of those ages; and it is certain that all those of early date were open overhead. Many of the coaches used by the continental princes and nobles in the 16th c. were closed only to this extent—that they had canopies supported by ornamental pillars, and curtains of cloth, silk, or leather, which could be drawn easily aside. A *glass* C., or C. with glass windows, is specially mentioned as being used by an Infanta of Spain in 1631. The traces of the coaches were at first made of rope; those only belonging to the highest personages were made of leather. It is believed to have been in the time of Louis XIV that coaches were first suspended by leathern straps in order to insure ease of motion.

The first C. ever seen in England is said to have been one made in 1555 by Walter Rippon for the Earl of Rutland; and in 1564 the same builder made a showy vehicle for Queen Elizabeth. Later in the reign the royal carriages had sliding panels, so that the queen could shew herself to her loving subjects whenever she desired. During the closing years of Elizabeth's reign, and early in the 17th c., the use of pleasure carriages extended rapidly in England. The coaches had first to struggle against the opposition of the boatmen on the rivers, and then against that of the sedan owners and bearers; but they gradually came into very general use. The successive steps whereby the coaches of those days gave way to the elegant vehicles of the present need not be traced in detail, even if there were the means to do so.

The following are some of the chief kinds of pleasure carriages. The *Dennet* is a two-wheeled vehicle for one horse, with a jointed hood or head covered with leather, and a driving box. The *Stanhope* bears some resemblance to the dennet. The *Tilbury* is in like manner a two-wheeled vehicle for one horse, but it has pliable leathern braces between the springs and the body of the vehicle, together with suspension brackets. The *Cabriolet* belongs to the same class as the tilbury. The

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name *Cab* is an abbreviation of cabriolet, but it has come to be applied to a four-wheeled vehicle. The *Curricle* is a two-wheeled vehicle for two horses; there are shafts, but a pole fixed to a frame which supports the body, passes between the horses, and is suspended from a metal bar resting on their backs. The *Phaeton* is a four-wheeled vehicle which may be drawn either by one or two horses; its front body is something like that of a dennet or stanhope, and behind this is an open seat supported on a kind of large box. The *Coach* is a closed four-wheeled vehicle for two or more horses, with two seats inside and a skilfully constructed arrangement of springs to insure ease of motion. The *Chariot*, or chaise of modern days, usually differs from the C. in having only one seat. The *Landau* is a C. made to open occasionally. The *Barouche* is permanently open, with only a leathern hood or head over it. The *Britzschka* is a kind of small baroncho. In addition to these, our age has witnessed the manufacture of the *Brougham*, a miniature coach usually for two persons, but in which four may be accommodated; and the *Clarence*, a pair-horse carriage with movable glazed panels and hood, and for two or more persons.

The manufacture of carriages, whether pleasure-vehicles or omnibuses, ranks in the highest class of mechanical labor. There is a necessity for the best materials and the best workmanship; since, owing to the severe strains and jerks to which the vehicles are subject, cheap construction is in the end unprofitable. Many different kinds of wood are employed in the construction. The body of the C. is made by one set of workmen, the under-framing by another; the former partaking more than the latter of the nature of cabinet-work. The steel-spring making is delicate work, owing to the necessity for combining strength with lightness and elasticity; and the various pieces of iron-work require careful adjustment, especially the axles. The covering of the upper part of the body of a C. with leather is one of the most difficult parts of the manufacture; one single hide is employed, the leather being worked round the corners by repeated carrying while wet; and all must be rendered smooth, without even a puncture. The best coaches receive as many as 20 to 30 coats of oil-paint; and the polishing processes are numerous and carefully conducted. The carving, gilding, herald-painting, lace and fringe work, metal ornamentation, &c.—all are among the best examples of their respective handicrafts.

English carriages are considered to be the best in the world; none else combine so much strength with an equal degree of beauty. The artisans employed in this trade, especially coach-body makers and coach-spring makers, command a very high rate of wages.

COACH-DOG, or Dalmatian Dog, a variety of dog apparently allied to the hounds, although it is said to be deficient both in keenness of scent and in sagacity. It is often kept in stables, becomes attached to the horses, and may be seen running after carriages. Its general light color and numerous dark-brown or black spots are constant characteristics; as are also its short hair, tail destitute of brush, and inoffensive disposition. Its origin is uncertain; the name Dalmatian is probably altogether misleading; and it is supposed that it may have been brought from India, where a very similar kind of dog exists.

COADJU'TOR (Lat.), a fellow-worker not as principal but as second, an assistant. Technically, it is applied in ecclesiastical law to one appointed to assist a bishop, whom age or infirmity has disabled. By 52 Geo. III. c. 62, coadjutors to bishops and archbishops in Ireland are empowered to exercise all the powers of their principals except that of presenting to benefices. See EXECUTOR.

COAGULA'TION, the amorphous (q. v.) solidification of a liquid, or part of a liquid, as when the caseine of milk is solidified by rennet in making Cheese (q. v.), or the white of an egg by boiling. The process varies in various substances. Albumen, or the white of an egg, coagulates at a temperature of 160°. Milk is coagulated or curdled by the action of rennet or by acids. The fibrin in the blood, chyle, and lymph of animals is coagulated by the separation of these fluids from the living body. See BLOOD.

COAHUI'LA, a state of the Mexican Confederation, is separated from Texas, in the United States, by the Rio Bravo del Norte, in lat 24°—30° n., and long. 100°—103° e. It contains 50,000 square miles, and (1873) 98,397 inhabitants. The capital is Saltillo, with a population of 8105; there are besides the towns of Coahuila and

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Santa Rosa. It possesses some silver mines; but it is valuable chiefly for its pasturage.

CÖATTA. See ATELES.

COAL, in the sense of a piece of glowing fuel (and hence a piece of fuel, whether dead or alive), is a word common to all the languages of the Gothic stock (Icel. *kol*, Ger. *kohle*), and seems allied to the Lat. *caleo* to be hot; as also to *glow*, and *kiln*. The different sorts of fuel are distinguished by prefixes, as *charcoal*, *pit-coal*, *sea-coal*; but in England, owing to the absorbing importance of mineral or pit-coal, the word C. alone has come to be used in this special signification (Ger. *steinkohlen*, Fr. *charbon de terre*).

C. is one of the most important of all minerals; it consists chiefly of carbon, and is universally regarded as of vegetable origin. Its geological relations are noticed in the article CARBONIFEROUS SYSTEM. It generally occurs in strata or beds; it is always of a black or blackish-brown color; some of the varieties have a very considerable degree of vitreous or resinous lustre, and some are very destitute of lustre; some have a shell-like fracture, and some have a sort of slaty structure, and are readily broken into cubical or rhomboidal fragments. The precise characters of C. as a mineral species are not easily defined, and both in Britain and other countries important cases have occupied courts of law, in which this difficulty was strongly felt, as in the great Scottish lawsuit concerning the *Torbanehill Mineral* (q. v.). C., indeed, is rather a commercial than a scientific term, but in a general way we may define it as a fossil fuel of black color and stony consistency, which, when heated in close vessels is converted into coke with the escape of volatile liquids and gases. The variety known as blind coal or anthracite no doubt gives off scarcely any volatile matter, but this is because it has undergone a natural distillation through metamorphism or other cause. We may therefore divide C. into two primary divisions, namely, (1) *Anthracite*, which does not, and (2) *Bituminous C.*, which does flame when kindled. Anthracite (q. v.) sometimes contains as much as 94, and if we exclude the ash, 98 per cent. of carbon, and as this element decreases in amount it graduates into a bituminous coal. The term anthracite is, however, still applied to some coals which do not contain more than 80 per cent. of carbon. Various synonyms, such as stone C., glance C., culm, and Welsh C., are also used to designate this substance, which is used chiefly for smelting purposes and for raising steam. It is difficult to kindle, but gives out a high heat in burning. Bituminous C. includes an almost endless number of varieties, one of the best marked being *cannel* or *parrot C.* Cannel C. is so called from burning with a bright flame like a candle, and the name parrot C. is given to it in Scotland from the crackling or chattering noise it makes when burned. That of different localities varies much in appearance, but it is most commonly dull and earthy, or with only a slight lustre; some examples are, however, bright and shining. In texture it is nearly always compact, and certain beds of it admit of being polished in slabs of considerable size, which approach black marble in appearance. Of this material vases, inkstands, boxes, &c., are made. Cannel C., from the large percentage of ash which it contains, is not suitable for house fires, and is for the most part consumed in making gas, of which it yields from 8000 to 15,000 cubic feet per ton. When distilled at a low red-heat it yields paraffin oil. The other varieties of bituminous C. are so numerous that, as an admiralty report states, there are as many as 70 denominations of it imported into London alone. Still, among these there are three leading kinds—1. *Caking C.*, which cakes or fuses into one mass in the fire. It breaks into small uneven fragments, and is found largely at Newcastle and some other localities. 2. *Splint or hard C.*, occurring plentifully in Scotland, which is hard, and has a kind of slaty fracture. It is not very easily kindled, but when lighted makes a clear lasting fire. 3. *Cherry or Soft C.*, which breaks easily into small irregular cubes, has a beautiful shining lustre, is readily kindled, and gives out a cheerful flame and heat. It is common in Staffordshire. Brown C. or Lignite (q. v.), though inferior to true C., is nevertheless an important fuel in some countries in default of a better kind.

The use of C. does not seem to have been known to the ancients; nor is it well known at what time it began to be used for fuel. Some say that it was used by the ancient Britons; and at all events it was to some extent an article of household consumption during the Anglo-Saxon period as early as 852 A.D. There seems to be

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reason for thinking that England was the first European country in which C. was used to any considerable extent. About the end of the 13th c., it began to be employed in London, but at first only in the arts and manufactures; and the innovation was complained of as injurious to human health. In 1316, the parliament petitioned the king, Edward II., to prohibit the use of C., and a proclamation was accordingly issued against it; but owing to the high price of wood, its use soon became general in London. It was for a long time known there as *Sea-C.*, because imported by sea.

Several theories as to the mode of the origin of C. have been put forth from time to time. The one now generally believed in is that the rank and luxuriant vegetation which prevailed during the carboniferous age grew and decayed upon land but slightly raised above the sea; that by slow subsidence this thick layer of vegetable matter sunk below the water, and became gradually covered with sand, mud, and other mineral sediment; that then, by some slight upheaval of the sea bottom or other process, a land surface was once more formed, and covered with a dense mass of plants, which in course of time decayed, sank, and became overlaid with silt and sand as before. At length, thick masses of stratified matter would accumulate, producing great pressure, and this, acting along with chemical changes, would gradually mineralise the vegetable layers into coal. Some experiments made by Dr. Lindley a few years ago, shewed that of a large number of plants kept immersed in water for two years, the ferns, lycopodiums, and pines were those which had the greatest powers of resisting decay, and C. appears to be mainly composed of the substance of the ancient representatives of these three orders of plants. The interesting fact has also been lately proved by Huxley, Morris, Carruthers, and others, that in many instances the bituminous matter in C. is almost wholly formed of the spore cases and spores of plants allied to our club-mosses and ferns.

As will be seen from the following table, wood, peat, lignite or brown C., and true C. indicate by their composition the changes which vegetable matter undergoes by decay and pressure; and a table in which a considerable number of examples of each substance could be given would shew how gradually these substances pass into each other:

	Wood.	Peat.	Lignite.	Coal.
Carbon	50·0	60·0	65·7	82·6
Hydrogen.....	6·2	6·5	5·3	5·6
Oxygen.....	43·8	33·5	29 0	11·8
	100·0	100·0	100·0	100·0

In each of these bodies there is usually a small percentage of nitrogen, which in the above table has not been separated. In passing from wood or peat to C., the proportion of oxygen and hydrogen decreases, these substances being given off in the form of marsh-gas and carbonic acid in the process of decay.

Since the prosperity of our great national industries, as well as much of our domestic comfort, depends on the continuance of an abundant supply of cheap fuel, much anxiety has arisen in Great Britain of late years regarding the future supply and price of coal. Since the fall of 1872, a great rise has taken place in its price. This is partly owing to the unusually high rate of miners' wages which has prevailed, and partly to the fact that some of the richest and most easily worked English coal-seams are becoming exhausted. There is therefore some cause for apprehension, yet, as the following figures taken from the estimate in the report of the royal commission on C., dated 1871, will shew, we have still vast supplies of fossil fuel.

Taking into account the coal which probably exists under the Permian, New Red Sandstone and other superincumbent strata in the United Kingdom, the coal commissioners increase their estimate of the quantity still available for use to 146,480 millions of tons. At the present rate of annual production—namely 123,500,000 tons, this would last 1186 years. But, as may be supposed, the estimates which have been put forth regarding the probable duration of our coal-fields are very various, some authorities asserting that, owing to increase in population, and the increasing consumption of coal in manufactures, about 100 years will suffice to exhaust them. Between this and the other extreme of about 1000 years, formed on the assumption that hereafter the population of the country will but slightly increase, there are innumerable conjectures and estimates.

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AVAILABLE COAL IN THE CHIEF BRITISH COAL-FIELDS, AT DEPTHS NOT EXCEEDING 4000 FEET, AND IN SEAMS NOT LESS THAN 1 FOOT THICK.

	Tons.
South Wales	32,456,908,913
Midland (Yorkshire, Derbyshire, and Nottinghamshire)	18,172,071,433
Northumberland and Durham	10,036,660,236
Lancashire and Cheshire	5,546,000,000
Bristol	4,218,970,762
North Staffordshire	3,825,488,105
Lesser English coal-fields	5,952,740,019
Total of Scottish coal-fields	9,843,465,930
Total of Irish coal-fields	155,680,000
Grand total	90,207,235,398

On the continent of Europe, productive coal-fields occur in Belgium, France, various parts of Northern Germany, Spain, and Russia. By far the largest in area are those of Russia, and they are known to contain many valuable beds of C., although, as yet, comparatively little has been worked. C. is also found in India, China (where the coal-fields are estimated to cover 400,000 square miles), Japan, and the Malayan Archipelago, in Australia and New Zealand, and in Africa. Turning to the New World, there is evidence of promising coal-deposits in several South American countries, but, owing to the great supply of wood in their forests, there is little temptation to work them. In Canada, Nova Scotia, New Brunswick, and Newfoundland, there are small, though valuable, coal-fields; but, in the United States, enormous fields of fossil fuel are found. The entire area of these is about 200,000 square miles, being 38 times greater than the area of the coal-fields of Great Britain. But although the coal-measures of the States are of vast extent, and contain many valuable coal-seams—a few of them 40 and even 50 feet thick at certain places—it has been doubted whether the amount of workable C. in them is not greatly exaggerated by American writers. In proportion to the extent of the seams the quantity of C. annually raised in the States is small, being only about 40,000,000 tons.

Coal-trade.—The production and sale of C., like every other important branch of industry, was long fettered with legislative regulations. At a very early period, the corporation of the city of London undertook the duty of either weighing or measuring the C. brought into the port, and by a series of statutes, commencing with 7 Ed. VI. c. 7, the mayor and aldermen of London, and the justices of the counties, were empowered to fix the price of C. to be sold by retail; and in case of refusal by the parties to sell at the prices fixed, to enter their wharves, or other places of deposit, and to cause it to be sold at the prices which they had set. In addition to the general supervision which they thus possessed, and the sums which they were empowered to exact for their trouble, the corporations of London and other towns have exacted, and still continue to exact, dues on C. for local purposes. These were first imposed in London in 1667, after the great fire, in order to enable the corporation to repair the ravages which it had committed; and they have been since continued as a fund for civic improvements, though, as Mr M'Culloch has remarked, no improvement could be equal to a reduction in the price of coal. In the reign of William III., a general tax, payable to government, was laid on all *sea-borne C.*—a tax which was in the highest degree unjust to places which were dependent for their supply on the coasting-trade, and oppressive to the whole country, inasmuch as it amounted to more than 50 per cent. on the price paid to the owner at the pit's mouth. The tax varied in amount, not only at different periods, reaching its highest point of 9*s.* 4*d.* per chaldron during the great war, but also in different parts of the country, being higher in London and the south of England, and lower in Ireland and Wales, whilst Scotland for a considerable period was altogether exempt. The tax itself, with all its inequalities, was abolished in 1830, and there is now no tax on C. except that collected for local purposes in London, and a few other towns. The repeal, in 1845, of the duty on C. exported to foreign countries, was a measure of much more doubtful policy. The average annual quantity of C. exported from Great Britain during the three years ending 1876 was above 14,000,000 tons.—For the provisions of the recent statutes for the

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regulation and inspection of mines (23 and 24 Vict. c. 151, and 35 and 36 Vict. c. 76), see MINES. The circumstances in which coal-mines are regarded as a pertinent of land, and those in which they form a separate estate, are stated under MINES.

Coal-note, a particular description of promissory-note, used in the coal-trade in the port of London (3 Geo. II. c. 26, ss. 7, 8). See COAL-SUPPLY.

COA'L-BEDS. See CARBONIFEROUS SYSTEM.

COA'LBROOK DALE, an English coal-field in the valley of the Severn, which supplies considerable quantities of coal and iron. The group of strata which includes the coal-beds is from 700 to 800 feet thick.

CO'AL-FISH (*Merlangus carbonarius*), a fish of the same family with the Cod and Haddock (*Gadidæ*), and of the same genus with the Whiting. It is not unlike the whiting in form, and in its fins, which, however, are not proportionally so large; but is of a very different color, the upper parts being nearly black. It attains, also, a much larger size, being often two or three feet in length. It is celebrated among fishermen for its voracity; and is commonly found in large shoals, which, when attracted by bait, will keep near a boat till great numbers are taken. It is rather a coarse fish, but is much used in the northern parts of the world, both fresh and salted, or dried. It is found in the most arctic regions, even on the shores of Spitzbergen, and both on the European and American sides of the Atlantic. It is very plentiful on the British coasts, and in Scotland is generally known as the *Sethe*. The fry are taken in great numbers by juvenile fishers stationed on rocks, and are called *podleys* on the east and west coasts of Scotland, *sillocks* and *cuddies* on some of the Scottish coasts, and *coalseys* in the north-east of England. This fish forms an important part of the food of the Orkney and Shetland islanders, and of the inhabitants of some of the Hebrides. Vast numbers of the fry are sometimes caught by means of blankets in the mouths of streams in the Hebrides. The liver of the C. abounds in oil, which is used for lamps.

CŌALI'TION, in Politics, is applied to the union of two parties, or, as it generally happens, portions of parties, not of the same opinion, who yet agree to sink their differences, and act in common. Pitt, the elder, when he took office in 1757, coalesced with the Whig aristocracy represented by the Duke of Newcastle. The ministry always spoken of, however, as the Great C. was formed in 1782, when Fox, the leader of the Reformers, took office along with Lord North, the leader of the opposite party. When Lord Derby's ministry resigned in 1853, there was a short C. between the Whig party, under Lord John Russell, and the more moderate of the Conservative party, under Lord Aberdeen.

COAL-SUPPLY. Referring to CARBONIFEROUS SYSTEM and COAL for various details connected with the localities of coal-beds, the diversity of qualities, and the modes of working, we shall treat here of a question which has recently been accepted as one of great importance to the welfare of the nation—viz., the amount of available supply. All the coal now existing was formed untold ages ago, when the conditions of temperature and moisture on the earth's surface were different from those now prevailing. Coal is not a growth annually renewable, but an accumulation which we are gradually spending. We are living, not on the interest of our coal, but on the capital. This is a truth which scientific men have recognised for some time past; but statesmen and manufacturers, mine-owners and merchants, have paid singularly little attention to the subject, under the supposition that the existing stock will last for so great a period as to relieve us from all anxiety on the matter. John Williams in 1789, Sir John Sinclair in the "Statistical Account of Scotland," Robert Bold in 1812, and Dr Buckland in 1830 were almost the only writers, until recently, who cautioned England that her supply of coal will not last for ever. Two volumes on the "Coal Question," by Mr Hull and Mr Jevons respectively, have now, however, effectually roused public attention to the matter.

At the Newcastle meeting of the British Association, in 1864, Sir W. G. Armstrong, as chairman, forcibly urged the subject on the attention of scientific and practical men. He said: "Contemplating the rate at which we are expending those seams of coal which yield the best qualities of fuel, and can be worked at the least expense, we shall find much cause for anxiety. . . . . We have already drawn from our choicest mines a far larger quantity of coal than has been raised in all other

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parts of the world put together; and the time is not remote when we shall have to encounter the disadvantages of increased cost of working, and diminished value of produce." He urged especially that we ought not to squander our coal as at present. We waste nearly all the smoke, heated air, and heated gases from our furnaces; we waste sadly in our open fire-places; and there is a vast quantity of small-coal recklessly burned at the pit's mouth. Various statistics as to supply and consumption had furnished Sir W. G. Armstrong with his data. So widely have estimates differed as to available quantity still in store, that between 1792 and recent times, the conjectures, for Northumberland and Durham alone, varied from 200 years to 1700 years, as the period during which the whole nation could be supplied from this one coal-field; but more earnest attempts have been made in late years to arrive at approximate figures. In 1857, M. De Carral, a Prussian mining-engineer, estimated the coal-mining of that year in all countries at 125 million tons, with an average value of 7s. per ton at the pit's mouth; he credited Prussia with enough unexhausted coal to supply all the world for 900 years. In 1861, Mr Robert Hunt ascertained, by reliable mineral statistics, that Great Britain raised 86 million tons in the year; that the quantity was increasing by nearly three million tons every year; and that we were working our mines at thrice the rate which had been in force 20 years before. These facts had much influence in drawing the attention of public men to the subject. The produce of Great Britain in 1861 was from 3052 collieries; and the different districts joined in the supply as follows: Durham and Northumberland, 19 million tons; Lancashire, 12; Yorkshire, 9; Staffordshire and Worcestershire, 7; South Wales, 7; Derbyshire and Nottinghamshire, 5; Scotland, 11; all other districts, 16—amounting to a total of 86 million tons. M. Burat, in his "Situation de l' Industrie Houillère en" 1864, estimated the coal produce of the world at 141 million tons, of which he credited Great Britain with about four-sevenths. In the same year Sir W. G. Armstrong taking Mr Hull and Mr Hunt as his authorities, estimated the available stock of coal in the United Kingdom at 80,000 million tons, rejecting all seams below 4,000 feet as too deep to work, and all less than two feet thick as too thin to work. Taking 1864 as a standard of consumption it would last 930 years; but at the rate of increase of recent years, it would only last 212 years, because this rate would be geometrical and not merely arithmetical in its progression.

In the year 1866, the question came into the arena of the British parliament. On April 17, during a discussion in the House of Commons on the malt-tax, Mr J. Stuart Mill dwelt on the fact, that coal is one of our greatest sources of national wealth; and he accepted as trustworthy the calculations of Mr Jevons—that in three or four generations, we shall have scarcely any usable coal at a less depth than 4000 feet, a depth which will either be unworkable, or workable only at a greatly increased cost. This speech made a great impression on the House; and the government, a few days afterwards, undertook to ascertain what facts the officers of the Geological Survey possessed on the subject. On May 3, the Chancellor of the Exchequer, Mr Gladstone, made his financial statement for the year, in which he accepted Mr Mill's views, based as they were on the opinions of Sir Roderick Murchison, Sir John Herschel, Sir W. G. Armstrong, Dr Percy, Mr Hull, Mr Jevons, and other authorities. He assented to the probability that by the year 1970, if matters go on at their present rate, we shall have no coal left. "I disbelieve and disapprove," he added, "of all attempts to limit by law the consumption of coal. In vain would it be to think of stopping the consumption of coal in this country; in vain would it be to think of diminishing that consumption by the imposition of a tax; and it would be more vain still to think of prohibiting its exportation." In other words, the remedy, if any, can *not* be by legislation. The question was brought to a decisive point on June 12, when Mr Hussey Vivian moved an address to the crown, praying for the appointment of a royal commission to investigate the whole matter. In an elaborate speech, he stated his reasons for believing that the forebodings of Mr Hull and Mr Jevons are too gloomy—that advancing science will enable miners to contend against the temperature and pressure of deeper mines than have hitherto been thought practicable; that we shall be better able than ever to ventilate and drain the deep workings; that the area of coal workable even with our present means is larger than has been estimated; that the magnesian limestone and new red sandstone beds are likely to afford an opening for new stores of coal quite incalculable in amount; that the theory of

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an increase of consumption in a geometrical ratio is not tenable; and that we shall probably economise consumption in future years by the adoption of new processes, new furnaces, new stove-grates, smoke-consuming apparatus, and the utilisation of waste heat and gases. Although entertaining these favorable views, he nevertheless suggested official inquiry. The government assented; and a Royal Commission, comprising the Duke of Argyle, Sir Roderick Murchison, Sir W. G. Armstrong, Mr. Vivian, Mr. Prestwich, Dr. Percy, Mr. Jukes, Mr. Robert Hunt, and several other experienced men, was appointed in July 1866.

The Coal Commissioners gradually collected a large body of information concerning the quantity of coal raised annually in the United Kingdom; the probable future rate of increase; the quantity still remaining at available depths underground; and the best means of economising coal in future. They obtained a great mass of evidence, which was published in 1871, with maps, plans, and diagrams. They reported that the deepest of our mines are about 2000 feet, but that 4000 feet might possibly be worked with improved lifting and ventilating appliances. They estimated the coal of the United Kingdom, at all depths down to 4000 feet, at 90,207 million tons—viz., 46,000 millions in England; 34,000 millions in Wales; 10,000 millions in Scotland, and a mere trifle in Ireland. The largest single coal-field they found to be that of South Wales, 32,000 million tons. Many geologists believe that coal underlies the New Red Sandstone and Permian formations, and that an additional quantity of 56,000 million tons might possibly be obtainable from this source. Supposing the available total to be 146,000 million tons, the Commissioners endeavored to estimate how long it would last. The quantity raised in 1869 was 107,000,000 tons, of which 97,000,000 were retained for home consumption. Taking into account all the circumstances which had to be considered, the Commissioners expressed an opinion that our coal-supply will be exhausted in 300 years.

Since 1871, the subject has been much discussed. The balance of opinion tends towards a greater duration than 300 years; but all is vague guessing on this point. The coal-harvest of Great Britain in 1872 was 128,000,000 tons; in 1873, 127,000,000 tons; and in 1874, 125,000,000 tons.

Consequent on the revelations concerning our (future) coal famine, other nations are making renewed investigations respecting their own reserve deposits.

COAL-TAR. See GAS-TAR.

CO'AL-WHIPPING, the name given to a mode of unloading coal from vessels at anchor in the Thames. About 2,000,000 tons of coal are annually transferred from vessels in the river to barges, which convey them to the wharves. The operation is called C., and the men *coal-whippers* —names, the origin of which does not seem to be known. The men work in gangs of nine—a *basket-man* and eight others. Some of them shovel the coal from the hold of the ship into baskets or boxes; some haul up the boxes by ropes and pulleys; and some empty the contents into the barges.

This is all the operation—a mere example of muscular labor of the coarsest kind. It would not have called for notice in this work, had not legislative interference given a factitious importance to it. Some years ago, when the number of these men was about 2000, public house keepers got into the habit of acting as middlemen, a position which gave them the power of compelling the men to spend nearly all their earnings in drink. The trade fell into such a state that the men were virtually slaves to the publicans. They asked for the interference of the legislature, and this was granted in 1843. An act was passed expressly for these 2000 coal-whippers. A Coal-whippers' Board was formed, comprising members named by the Board of Trade, others named by the Corporation of London, and one by the Shipowners' Society. This Board assumed the functions of a middleman or master coal-whipper; contracted for the whipping of ships of coal, and employed the men. No one but men registered on the books of the Board was allowed to work on the Thames as a coal-whipper, with the exception of the crews of the ships and the servants of the coal owners. This exceptionally protected trade was maintained on the same basis by other acts passed in 1846 and 1851. In 1856, however, a further renewal was refused, and a committee of the House of Lords in 1857, while sympathising with the men, declined to recommend any further special legislation for them. The coal owners agreed with the Board of Trade to maintain a Whipping Office to give the

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men a refuge from the publicans, but without interfering with the liberty of coal shippers to employ whom they pleased; and this plan has since been acted on. The office is at the Coal Exchange, with a men's rendezvous near Ratcliff. The necessity for coal-whippers has been much lessened of late years by the use of a floating derrick in the Thames, by which the contents of a coal ship can be transferred to the barges in a few hours by steam power.

COA'MINGS, in a Ship, are small frameworks on the deck, to prevent sea and rain water from running down the hatchways, ladder-ways, and scuttles.

CÕA'NZA, a river of Lower Guinea, Western Africa, which, after a course of about 500 or 600 miles, enters the Atlantic south of St Paul de Loando, in lat. about 9° 10′ s. It is navigable for a considerable distance, but a bar at its mouth renders it inaccessible save to small vessels.

COA'ST-GUARD, an organization formerly intended to prevent smuggling merely, but now constituted so as to serve as a defensive force also. The old coast-guardsmen were in the employment of the Customs department; they were posted along the shore at spots commanding extensive views of the beach, and were expected to be always on the lookout for smugglers. In 1856, the C. was transferred to the Admiralty, and under this arrangement, the Admiralty may, from time to time, issue orders for the augmentation of the C., not to exceed 10,000 men in all. Lands, not exceeding three acres each, may be bought by the Admiralty for C. stations. The coasts of the United Kingdom have been divided into 9 districts. Each district is under a navy captain, who has an iron-clad guard-ship at some port in the district. All the revenue-cruisers and defence-gunboats are attached as tenders to the ships, and are manned therefrom. The able seamen, borne on the ships' books, and employed on shore in C. service, are in three classes—chief boatmen, commissioned boatmen, and boatmen. They receive high sea-pay, besides 1s. 4d. per day in lieu of provisions, and house-rent and medical attendance free. In war-time, all of these men may be called upon to serve as regular sailors on board ship; but their families are allowed to live rent-free during this time. The C. are taught naval gunnery, gunboat exercise, and the serving of land-batteries. The guard-ships are also employed as training-ships for the navy. The whole of the C. in 1878 consisted of 4300 men, whose maintenance is provided for by the vote for the navy. In 1877—78, their special expenses amounted to £49,701.

COAST Volunteers, or Royal Naval Coast Volunteers, is a corps organised for the special defence of the coasts of the United Kingdom, separate from, but in connection with the Coast-guard (q. v.). By an act of parliament passed in 1853, the Admiralty was empowered to raise a number, not exceeding 10,000, of C. V., to consist of seafaring men and others, to be entered for five years' service, and to be exercised 28 days in each year, either on shipboard or on shore; but not to be sent more than 50 leagues from the coasts of the United Kingdom, unless in cases of emergency, when the distance might be extended to 100 leagues. One year's active service entitles them to discharge in ordinary cases; but in emergencies, they may be called out a second year on receipt of higher pay. Their pay, allowance, and rank during exercise and active service is the same as able seamen's. The bounty to be paid on entering, and the arrangements for arms, clothing, and accoutrements, are left for the Admiralty to settle from time to time. An act passed in 1856 invested the command of the C. V. in the Coast-guard, the officers of which are to superintend the training and exercising. As a matter of fact, the force is a very small one (600), and a failure.

COASTING-TRADE, the commerce carried on by sea between the different ports of the same country. In Great Britain, "coastwise" is defined to mean "from any one part of the United Kingdom to any other part thereof." Vessels engaged in this commerce are subject to different rates and regulations from over-sea traders, and the masters must keep books shewing that their cargoes come strictly within the definition of coasting-trade. Formerly, no goods or passengers were allowed to be carried from one port of the United Kingdom to another, except in British vessels; but this restriction was repealed in 1854, and the C. of Great Britain is now open to all the world. In other countries, the exclusive policy still prevails. The regulations under which the C. are conducted are contained in the

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Customs Consolidation Act, 16 and 17 Vict. c. 107 (see M'Culloch's "Commercial Dictionary").

COAT OF ARMS, in the military trappings of the middle ages, held the place of the *paludamentum* of the ancient Roman captains. It was a coat worn by princes and great barons over their armor, and descended to the knee. It was made of cloth of gold or silver, of fur or of velvet, and bore armorial insignia. The "coat of arms," as understood by heraldry in the present day, is nothing more than a relic of the ancient armorial insignia, divested of the coat on which it used to be embroidered. See SHIELD, HERALDRY.

COAT OF MAIL, in the armor of the middle ages, was a suit made of metal scales or rings, linked one within another. See ARMOR.

COATBRIDGE, a rising and prosperous town of Scotland, in the parish of Old Monkland, about eight miles directly east of Glasgow, on the Monkland Canal and Caledonian Railway. The town is straggling, has some good houses, and a number of small villages or suburbs on its outskirts. There are six churches besides the parish church, two academies, and several other schools, banks, &c. The town is in the centre of a mineral district, is surrounded by about fifty smelting-furnaces, and contains eight malleable iron works, one tin-work (the only one in Scotland), and several other works connected with the iron manufacture. C., owing to the great increase in the iron trade, has grown very rapidly in size and prosperity within the last 30 years. Pop. (1841) 1599; (1851) 8564; (1861) 10,501; (1871) 13,624; and still rapidly increasing.

COATI, or Coati-Mondi (*Nasua*), a genus of quadrupeds of the family *Ursidæ* (the Bear family); by some naturalists referred to *Viverridæ* (the Civet family), although their *plantigrade* character allies them rather to the former. They are most nearly allied to the racoons, and, like them, are exclusively American. They are chiefly remarkable for the elongation of the snout, which is a sort of flexible proboscis, and is turned about in search of food, and employed in rooting up the earth to obtain worms and insects. They are often domesticated in South America, and are very affectionate, active, troublesome, and amusing.

COBALT (from *Cobalus*, a malicious sprite or gnome) is a metal of no use in the arts and manufactures, but which forms compounds of commercial importance. C. (symbol Co) is found naturally in combination with arsenic (As) as *Speiss C.* ($CoAs$); in combination with arsenic and sulphur, as *C. Glance*, the arsenide and sulphide of C. (CoS_2CoAs); in ores of Nickel (q. v.); and in the metallic state, it is found in meteoric stones or Aërolites (q. v.). The metal has been obtained in laboratory experiments, and presents a gray color with a reddish tinge, is highly magnetic, and is as hard and infusible as iron. It is a brittle metal, and forms no alloys of commercial use. The protoxide of C. (CoO) is employed in painting on porcelain, for producing a rich blue color. *Zafre* is the impure oxide obtained by partially mixing C. ore with two or three times its weight of fine sand. *Smalt* is the term applied to a deep blue glass, which owes its color to the presence of oxide of C., and which, when reduced to very fine powder, is employed occasionally by laundresses to correct the yellow color of newly washed linen, and by paper-makers as a blue pigment for staining writing-paper. Smalt is also used in the production of the blue colors in porcelain, pottery glass, encaustic tiles, fresco-painting, &c., and forms the principal ingredient in *Old Sevres Blue*, *Thenard's Blue*, *Turquoise Blue*, and *Variegated Blue*. See BLUE. A compound containing the oxides of C. and zinc is of a beautiful green color, and is known as *Rinman's Green*. The chloride of C., dissolved in much water, may be employed as a sympathetic ink. In dilute solutions, it is of a faint pink color, which is not observable when it is used for writing upon paper; but when heated before the fire, it loses water, and becomes blue, and the writing is then capable of being read. On allowing the paper thereafter to lie in a damp place, or exposing it to the vapor of steam from a kettle, water is again absorbed, and the writing returns to its invisible state. The addition of a little perchloride of iron to the ink, makes the writing appear green; a solution of zinc imparts a red tint; and a salt of copper, a yellow shade.

COBAN, a town of Central America, Guatemala, in the dep. of Vera Paz, in a fertile valley on the Rio Dolce, 55 miles north of the town of Guatemala. The

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inhabitants are nearly all Indians, are generally industrious and some of them wealthy, and possess plantations of sugar-cane, bananas, pimentos, and various kinds of fruit-trees. Pop. estimated at 14,000.

CO'BBETT, William, a celebrated English political writer, was born in March 1762, at Farnham, in Surrey, where his father was a small farmer. From his infancy, he was trained in habits of industry and self-dependence. Taking a dislike to rural occupations, he went to London, where he was employed a few months as a copying-clerk—a kind of employment so distasteful to him, that he enlisted into the 54th Foot, and with it went out to Nova Scotia shortly after. In this regiment he remained about eight years, in the course of which time his uniform good conduct, activity, and intelligence, had secured him the high promotion of sergeant-major. During his soldier-years, he indulged in none of the dissipations common to barrack-life, but devoted the whole of his leisure to the work of self-education. On his return to England, about the end of 1791, he obtained his discharge, married, and went to America in the following year. He settled in Philadelphia, where he commenced his career as a political writer. Under the signature of "Peter Porcupine," he was at this early stage as keen a Tory as in later life he was a Radical, and he lashed French republicanism and American democracy with a scorn as coarse and personal sometimes as it was always bitter. In America he was twice prosecuted for libel. He left America in June 1800, and returned to England. In January 1802, appeared the first number of his famous "Weekly Political Register," which he continued without intermission until his death in 1835. At first, Tory, the "Register" gradually changed its politics, until at last it became the most fierce and determined opponent of the government, then presided over by Pitt, and the most uncompromising champion of Radicalism. In 1810, having previously been twice tried and found guilty of libel on certain members of the government, he was sentenced to imprisonment for two years in Newgate, and to pay a fine of £1000, for having in the "Register" made some severe remarks upon the flogging of five militiamen. In 1817, in consequence of pecuniary embarrassments, and the dread of being sent to Newgate again, under the Six Acts for the suppression of freedom of discussion, C. went once more to America, where he remained more than two years, his articles for the "Register" being transmitted with unfailing regularity across the Atlantic. In 1829—1830, C. delivered political lectures in several of the principal towns of England and Scotland, and everywhere met with a most enthusiastic reception as the boldest and most powerful advocate of the people's rights. In 1832 he was returned to the first reformed parliament as one of the members for Oldham. His speeches in parliament, however, did not add to his reputation. He died June 18, 1835. Among C.'s best known works are his "English Grammar," "Rural Rides," "Cottage Economy," "Advice to Young Men and Women," and "Parliamentary History." C. was by no means a man of the first order of intellect; he was shut out altogether from the higher and more refined departments of human thought. But in dealing with matters of common sense merely, he exhibited a native vigor far surpassing that of any writer of his day. Nor can there be any doubt that, in spite of his crotchets and inconsistencies, he rendered lasting service to the cause of the people.

CO'BDEN, Richard, an eminent English politician, who was very aptly designated "the Apostle of Free Trade," was born at Dunford, near Midhurst, Sussex, in 1904. His father, who was the owner of some little property, which he cultivated himself, died while the subject of this article was yet young, leaving his family in comparatively poor circumstances. Richard was received into a wholesale warehouse belonging to his uncle, where he soon exhibited great aptitude for business. After some time, he became a partner in a Manchester house, his presence here being speedily made manifest by his superior quality and tastefulness of the printed calicoes of the firm. In 1834—1835, C. travelled in Turkey, Greece, and Egypt, and also visited the United States, the result of his travels appearing in two pamphlets, entitled respectively "England, Ireland, and America," and "Russia;" the latter intended as an antidote against the "Russophobia" then prevalent. In these pamphlets he also ridiculed the workings of diplomacy, and asserted England's mission to be the avoidance of war and the extension of commerce. In 1837, he contested unsuccessfully, on free-trade principles, the borough of Stockport; and in 1838 he carried

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in the Manchester Chamber of Commerce a motion to petition parliament for the repeal of all duties on corn. This was followed by similar action all over the country; and in the following year, petitions bearing some two millions of signatures for the repeal of the corn-laws were carried to London by 200 delegates. The motion of Mr. Villiers for repeal being rejected by a large majority of the House of Commons, the friends of free trade determined to form the Anti-corn-law League (q. v.), of which C. became the most active and prominent member. To his lectures all over the country, and his speeches in parliament (to which he was returned in 1841 by the constituency which rejected him in 1837), all characterised by great information, clearness, and acute and convincing reasoning, was in great part due, as Sir Robert Peel acknowledged, the abolition of the corn-laws at so early a period as 1846. Having accomplished this great work, C. again visited the continent, and during his absence he was elected both for Stockport and the W. Riding of Yorkshire. He chose the latter constituency, which he continued to represent till 1857, when, on an appeal to the country by Lord Palmerston to support him in his Chinese policy, of which C. was a strenuous opponent, he was rejected. Shortly after the repeal of the corn-laws, the public testified its gratitude to him for the services he rendered in this matter by subscribing for him a magnificent testimonial of between £60,000 and £70,000. C. now gave up business, and devoted himself exclusively to politics. He continued to labor assidnously for the extension of free trade principles, for parliamentary and financial reform, for repeal of the taxes on knowledge, and was particularly earnest in enunciating national and international peace views; and to this feeling with regard to war, he owed his rejection at the general election of 1857. In 1859, having in the interval, on account of ill health, retired from politics altogether, he was, during his absence in America, elected for Rochdale. Lord Palmerston, who was at this time called upon to form a new ministry, with a just appreciation of the great services which C. had rendered to his country, offered him a seat in the cabinet, which C., as the uncompromising opponent of the noble lord's foreign policy, felt bound to decline. After his election for Rochdale, the state of his health did not permit him to take any part in parliamentary proceedings, but as her Majesty's plenipotentiary, he (1859—1860) arranged and concluded a treaty of commerce with France. C. spoke out strongly in favor of the North, during the American civil war. He died April 2, 1865.

COBI'JA, a town of Bolivia, claims notice chiefly as being the only seaport of the republic. It is situated in lat. 22° 34′ s., long. 70° 21′ w., and forms the capital of the department La Mar. Its population is less than 3000, and its trade inconsiderable, for, besides the disadvantage of an open roadstead to seaward, there extends inland the almost impracticable desert of Atacama. Hence most of the maritime commerce of the state (see BOLIVIA) passes, and that in the face of transit-duties, through the Peruvian harbors to the northward.

COBI'TIS. See LOACH.

CO'BLE, or CO'BBLE, is a low flat boat with a square stern, mostly used by salmon-fishers.

COBLENZ, a city of Rhenish Prussia, beautifully situated at the junction of the Rhine, and the Moselle, the former of which is here crossed by a bridge of boats, and the latter by a fine stone bridge. Being a bulwark of Germany against France, C. is defended by extensive fortifications, forming a fortified camp capable of affording accommodations for 100,000 men. For defence purposes, C. is connected with the almost impregnable castle of Ehrenbreitstein (q. v.), on the opposite side of the Rhine. Several detached forts also guard the city at various points. In the old town of C., many of the streets are irregular, narrow, and dirty; but in the new town they are generally well built, moderately wide, and cleanly. Among its principal buildings are the Church of St Castor, founded early in the 9th c.; the townhall; the old castle of the Electors of Treves, now converted into a japan-ware manufactory; the king's palace, used as a summer residence; and the government house. C. is a free port, and its favorable position secures it a very active commerce in wine, corn, iron, mineral waters, volcanic products for millstones, &c. Its principal manufactures are linen and cotton fabrics, japanware, and furniture. Many of the inhabitants are also employed in vine-culture. Population (1871), in-

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cinding a garrison of about 4600 men, 28,748. C. was known to the Romans as *Confluentes*.

CO'B-NUT, a name given to some of the largest and finest cultivated varieties of the HAZEL-NUT (q. v.).—In the West Indies, the name C. is given to the fruit of *Omphalea triandra*, a tree of the natural order *Euphorbiaceæ*. It is also called Hog-nut. The tree has a white juice, which turns black in drying, and in Guiana is used instead of ink. The fruit is a three-celled capsule, each cell containing one seed or nut, which, if the embryo is retained, has very cathartic properties, but after its extraction, is wholesome and pleasant.

CO'BRA DA CAPE'LLO, a name sometimes limited to the *Naja tripudians*, and sometimes extended to all the species of the genus *Naja*, very venomous serpents of the family *Viperidæ*, remarkable for the faculty of dilating the back and sides of the neck, which they do when angry or otherwise excited, and to which they owe their popular name, originally Portuguese, and signifying *hooded snake*; the elevated skin of the back of the neck presenting, when the animal is viewed in front, much the appearance of a hood. It is usually three or four feet long, of a pale rusty-brown color above, and bluish or yellowish-white below, and is characterised by a singular mark on the back of the neck, closely resembling the figure of an old-fashioned pair of spectacles, from which the animal sometimes receives the name of the *Spectacle Snake*. The C. da C. preys on lizards and other small animals. It is usually a sluggish creature, and is easily killed, even by means of a small stick or a whip. Its venom is extremely powerful, its bite causing death in two hours or less. Yet it is little disposed to use its fangs, except for the purpose of providing itself with food. The C. da C. is often to be found in the vicinity of human dwellings in the East Indies, and even in the houses themselves, attracted apparently by the young of the domestic poultry, and by the moisture of the wells and drainage. When one is found in or near a house, its mate is seldom far off. The Singhalese, when obliged to leave their houses in the dark, carry a small stick with a loose ring, the noise of which, as they strike it on the ground, warns the snakes to leave the path. The poison of the C. da C. is secreted in a large gland in the head of the serpent, which, when the animal compresses its mouth upon any object, flows through a cavity of the tooth into the wound. The poison, though most deadly when introduced into the system through a wound, possesses the curious property of being perfectly harmless when taken internally. Olive oil applied externally, and ammonia taken internally, cauterising, and ligatures immediately applied, may save life; but the poison is so deadly that instances of recovery of bitten persons are very rare. See Buckland's "Curiosities of Natural History," and Fayrer's "Thanatophidia of India" (London: Churchill). The other species of *Naja* are found in the warm parts of Asia, Africa, and Australia.

CO'BURG, a town of Central Germany, in the duchy of Saxe-Coburg-Gotha, picturesquely situated on the left bank of the Itz, a tributary of the Regen, in lat. 50° 15′ n., and long. 10° 58′ e. In the market-place are some striking old buildings, but the general appearance of the houses is one of cleanliness and comfort. C. is one of the chief ducal residences, and the palace, a Gothic edifice, erected in 1549, is one of the principal buildings in the town. The old castle of the dukes of Coburg, now partly used as a house of correction and prison, occupies a commanding height more than 500 feet above the town. The rooms, and the bed which Luther occupied when in concealment here in 1530, are still exhibited to the visitor, as well as the pulpit from which he preached in the chapel of the castle. During the Thirty Years' War, the castle was ineffectually besieged by Wallenstein. C., which is the seat of all the high courts of the duchy, has manufactures of woollen, linen, cotton, marquetry, and gold and silver articles, also dye and bleaching works. Pop. (1871) 12,819.

COBURG PENINSULA, the most northerly part of Australia to the west of the Gulf of Carpentaria, runs out in a north-west direction towards Melville Island, from which it is divided by Dundas Strait. On its north-east side is the bay, known as Port Essington, at the head of which, about lat. 11° 22′ s., long. 132° 10′ e., was established, in 1889, the settlement of Victoria—abandoned, on account of its insalubrity, six years thereafter.

CO'CA (*Erythroxylon Coca*), a shrub of the natural order *Erythroxylaceæ*, of

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which the leaves are much used by the inhabitants of Peru and Bolivia as a narcotic and stimulant. The dried leaves are chewed with a little finely powdered unslaked lime, or with the alkaline ashes of the quinoa (q. v.), or certain other plants. An infusion is also occasionally used. The properties and effects of C. resemble those of opium, although it is less narcotic, whilst it possesses the property of dilating the pupil of the eye, which opium does not possess. It also lessens the desire for ordinary food, and for some time, at least, enables the person who uses it to endure greater and more protracted exertion than he otherwise could, and with less food. It is especially remarkable for its property of preventing the difficulty of respiration, so common in the ascent of long and steep slopes at great elevations. But when used habitually and in excess, it weakens the digestion, produces biliary and other disorders, and finally induces a miserable ruin both of body and mind. It has been in use from a very remote period among the Indians of South America, and was extensively cultivated before the Spanish conquest. Many of the Indians of the Peruvian Andes are to this day excessively addicted to it, and its use is quite general among them, besides prevailing to a considerable extent among the other inhabitants of the same regions. Its culture and use have extended into Brazil and the countries on the banks of the Amazon, and it is supposed that about 80,000,000 lbs. of the dried leaf are consumed in a year, about 10,000,000 of the human race partaking in the indulgence.

COCCE'JI, Heinrich Freiherr von, born at Bremen, March 25, 1644, studied jurisprudence and philosophy in Leyden from 1667 to 1670, and went from thence to England. In 1672, he was made professor of the law of nations at Heidelberg; in 1689, he accepted the professorship of jurisprudence at Utrecht; and in the following year, was appointed to a similar office at Frankfort-on-the-Oder. In 1713, the emperor named him the baron of the realm on account of his good management of several important affairs. C. died August 17, 1719. As an erudite jurist, C. was the oracle of many courts, and his work on German civil law ("Juris publici prudentia," 1695) was almost universally used as an academical text-book for this branch of jurisprudence.—His youngest son, SAMUEL, born at Heidelberg in 1679, acquired no less renown. He, too, in 1703, became professor at Frankfort-on-the-Oder, and afterwards filled several honorable state-offices. At last, he was appointed great chancellor, in which function he died, October 22, 1755. His reform of the Prussian administration of justice, and his "Codex Fridericianus" (Berlin, 1747—1750), are among the greatest benefits his country owes him.

COCCE'JUS, or Cock, Johannes, a distinguished theologian, was born at Bremen, August 9, 1603. After preparatory studies in his native place, he, in 1625, went to Hamburg, where he studied Hebrew. From thence he went to Franeker in 1629. Returning to Bremen in 1630, C. was appointed professor of Hebrew at the Athenæum of his native place; called to Franeker for the same office in 1636, and in 1643 appointed professor of theology also. In 1650 he became professor of theology at Leyden, where he died in 1669. C.'s chief work is the "Lexicon et Commentarius Sermonis Hebraici et Chaldaici Veteris Testamenti" (Leyden, 1669) the first tolerably complete dictionary of the Hebrew language. The irrelevant and inaccurate matter which it originally contained, has been weeded out in the course of time by more skilful editors. In spite of his great learning, C. held very peculiar hermeneutical principles, which enabled him to discover the whole New Testament in the Old. The result, of course, was that he virtually transferred the language of the Old Testament to the New. The representation abundantly employed in the former of a covenant between God and man, usurped the place of the New Testament doctrine of the Fatherhood and Sonship; and his theology is simply a modern renewal of the old attempt to Judaise Christianity, which Paul denounced and condemned. C. carried the covenant theology, as it is called, to an absurd extreme. The most complete exposition of his views is in his "Summa Doctrinæ de Fœdere et Testamento Dei" (1648). C.'s principal antagonists were Voetius and Desmarets.

COCCINE'LLA. See LADY-BIRD.

CO'CCO, Co'coa Root, or Eddoes, plants, of the genus *Colocasia*, and of the nearly allied genus *Caladium*, of the natural order *Araceæ*, very generally cultivated in tropical and sub-tropical countries for their roots, or flat underground corms, which abound in starch, and are used as articles of food, being deprived by roasting or boiling of the characteristic acridity of the order, which, indeed, some of

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them possess in a comparatively small degree. They are sometimes included under the name *Yam*, but are totally different from the true yams. The names Cocco, Cocoa Root, and Eddoes, perhaps more strictly belong to *Colocasia antiquorum*, a stemless plant with ovate leaves, and flowers enclosed in a cylindrical erect spathe. The taste of its roots is like that of potatoes. *Colocasia esculenta* is a similar plant, a native of tropical America, and is much cultivated. *Colocasia macrorhiza* is the Tara (q. v.) of the South Sea Islands. In the Himalaya, *C. Himalensis* forms the principal food of many of the inhabitants. The root in its recent state is stimulant, diaphoretic, and expectorant.

COCCOLOBA. See SEA SIDE GRAPE.

COCCOMI'LIA, or COCUMIGLIA (*Prunus coccomilia*), a species of plum, a native of Calabria, and of which the bark—particularly of the root—is much used in that country for the cure of intermittent fevers. Its valuable qualities have been strongly attested by Neapolitan physicians, and it is employed both in private practice and in military hospitals, but it has not come into use in other countries. The C. has obovate leaves, short double flower-stalks, and austere tawny-yellow fruit.

COCCO'STÉUS, a genus of fossil fishes, peculiar to the Devonian measures. It was nearly related to Cephalaspis (q. v.), but differed in having, in addition to the bony helmet of that genus, a cuirass covering both the dorsal and ventral aspects of the body as far down as the origin of the dorsal fin, from which to the tail—comprising more than one-half the entire length of the animal—all seems to have been exposed without the protection even of a scale. In a well-preserved specimen in the British Museum, the remains of the endo-skeleton can be detected. Seven species have been described from the bituminous schists of the Old Red Sandstone of the north of Scotland.

COCCOTHRAU'STÉS. See HAWFINCH.

CO'CCULUS I'NDICUS, the name given commonly, and in the pharmacopœias, to a very poisonous seed, brought from the East Indies, which is used for various medicinal purposes, and illegally in the preparation of malt liquors. It possesses acrid and intoxicating qualities. It is used in India for stupifying fish, that they may be taken by the hand. An ointment made with it is a very efficacious remedy for ring-worm. It contains a most poisonous principle, called *Picrotoxine*, whilst the pericarp contains another called *Menispermine*, equally poisonous. It is the seed of the *Anamirta Cocculus*, a beautiful climbing plant, of the natural order *Menispermaceæ*. It imparts to beer its bitter taste, and at the same time a fullness and apparent richness, but renders it very deleterious in its effects. It has been frequently asserted that C. I. is used to a considerable extent by British brewers, but according to the Report of the Laboratory Department of the Inland Revenue Office issued in 1876, there is little ground for this belief, as in no case were the officers of the department able to discover the drug in any brewer's premises, or in any samples of beer. Of the large quantity imported, almost the whole is again exported, chiefly to Germany. The genus *Anamirta* is closely allied to the genus *Cocculus* (see CALUMBA), in which it was formerly included. The fruit of several allied species possesses properties analogous to those of the *A. Cocculus*.

CO'CCUS (Gr. *kokkos*, kermes), a genus of insects of the order *Hemiptera*, sub-order *Homoptera*, the type of a family, *Coccidæ*, allied to the *Aphis* (q. v.) family, although in many respects very distinct. The *Coccidæ* are sometimes called *Scale insects*, and by the French *gallinsects* (Latinised by some entomologists into *Gall-insecta*), but they are not to be confounded with the insects called gall-flies (*Cynipidæ* or *Gallicolæ*), which produce *galls* or nut-galls. The *Coccidæ* are very numerous, and are attached to particular plants, on the juices of which they feed, often producing much mischief by the flow and loss of sap which their punctures occasion, and giving great trouble to gardeners, who find it very difficult to free their plants, particularly in hot-houses, from the *scale*, the *mealy bug*, the *vine-gall*, &c. Various washes, consisting of soap, sulphur, tobacco, &c., are employed for this purpose; but moist heat, or as much exposure to steam as the plant can bear, has been found in many cases the most efficacious remedy. The destructive Coffee-bug belongs to this family. The male *Coccidæ* are winged insects, having only two wings, which shut horizontally upon the body; the abdomen is terminated by two threads. The

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females are wingless. It is not well known how the males subsist, as they have no apparent organs for sucking juices or eating any sort of food. The females have a beak, which they insert into plants in order to suck their juices. This interesting family of insects contains not only many troublesome species, but some which are of great value, particularly for the beautiful dyes which they yield. These dyes are obtained from the bodies of the female insects. Among them are Cochineal (q. v.) and Kermes (q. v.). A species of C. (*C. Polonicus*), which lives on the roots of the Knawel (*Scleranthus perennis*), yields the SCARLET GRAINS OF POLAND, a considerable article of commerce before cochineal was introduced into Europe; and a species which feeds on the roots of the burnet (*Poterium Sanguisorba*), was in like manner used by the Moors for dyeing silk and wool of a rose color. Other species produce Lac (q. v.) and WAX. See WAX INSECT.

COCCY'ZUS. See CUCKOO.

COCHABA'MBA, a name of various application in Bolivia.—1. A river which forms one of the head waters of the Amazon.—2. A city on the foregoing river, lying 145 miles to the north-north-west of Chuquisaca, the chief city of the Bolivian republic, and containing about 45,000 inhabitants. It has a temperate and healthy climate, and is engaged in the manufacture of cotton fabrics and glass wares.—3. A department of which the city just described is the capital, in lat. 17°—19° s., long. 65°—68° w. With an area of 26,000 square miles, it has a population of about 380,000. In addition to the precious metals, it yields cotton, sugar, dyewoods, and timber.

CO'CHIN, a protected state of Hindustan under the presidency of Madras, lat. 9° 48′—10° 50′ n., long. 76° 5′—76° 58′ e. With Malabar on its n.w. and n., and Travancore on its e. and s., it fronts the Arabian Sea on the s.w., and meets Coimbatore towards the n.e. On the water-shed of the Western Ghauts. It contains 1861 square miles and 298,353 inhabitants. Its hydrography is singular. The Western Ghauts, which have here an elevation of fully 4000 feet, intercept the south-west monsoon, and render the coast one of the most humid regions in the world during June, July, August, and September; while even during the remaining eight months, anything like an unremitting draught is unknown. As the space between the mountains and the sea is almost on a level with the tide, the countless streams have each two contrasted sections—the plunging torrent that breaks into comparatively short pieces the magnificent trunks of teak with which it is freighted: and the sluggish brook which, however it may vary, according to the season, in breadth and depth, pretty uniformly results in a brackish estuary. Further, these estuaries, almost continuously breasted by a narrow belt of higher ground, form between them a backwater or lagoon of 120 miles in length, and of every width between a few hundred yards and 10 miles, which communicates at only three points with the ocean. The cocoa-nut is the most valuable product of the country; besides this tree, however, the forests produce red cedar, anjelly teak, benteak, and many other hard woods, but these are now becoming very scarce. The low country produces rice, pepper, cardamoms, ginger, betel-nut, yams, arrow-root, and sweet potatoes. The population is peculiar in its composition more especially as compared with that of the more easterly parts of the peninsula. The great mass of the population are Hindus, but there are also Mohammedans, and a large number of Christians and Jews. The Jews are classified into white and black; and the Christians, divided between the Syrian and Romish Churches, trace their origin partly to the Portuguese conquest, and partly to the missionary labors of St Thomas the Apostle. Both the places of worship and the seminaries of education throw light on the relative numbers of the different parties. The latter, 95 in all, are—English, 5; Malayalam, 69; Tamul, 9; Mahratta, 1; Sanscrit, 7; and Hebrew, 4. The former are—Hindu, 2784; Mohammedan, 31; Jewish, 8; and Christian, 108.

COCHIN, once the capital of the principality above described, but now a seaport of the district of Malabar, in the presidency of Madras, stands in lat. 9° 58′ n., and long. 76° 18′ e., on the south side of the principal channel, between the open ocean and the backwater mentioned in the preceding article. As this lake, so to speak, is, even in its lowest state, always navigable for canoes, its value, as a means of communicating with the interior, can hardly be overrated in a country where roads and bridges are nearly out of the question. The harbor affords a depth of fully 25

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feet; but there is a bar in front, which according to the latest survey, has only between 17 and 18 feet of water upon it. On this bar, during the south-west monsoon, the surf breaks so violently, that it is sometimes, but not often, impassable for vessels. Still C. is next to Bombay on this coast with respect to ship-building and maritime commerce. Here the Portuguese erected their first fort in India in 1503. They were supplanted by the Dutch in 1663—the epoch also of the transfer of Bombay to Charles II. In 1796, C. was captured by the British, and about ten years after, its fortifications and public buildings were destroyed, and its private dwellings very much damaged. Notwithstanding this check, the place continued to flourish; many merchant vessels, ranging upwards to 1000 tons, have been built; and besides ships of war for the local navy, 8 frigates have been launched for the imperial service. The population of the city, numbering about 20,000, is more heterogeneous than even that of the state of the same name, the additional elements being Dutch, Armenian, Arabian and Persian. Its trade depends almost entirely on the produce of the cocoa-tree—viz., oil and cocoa fibre. Water is brought from a distance of 18 miles. The average temperature is 78° Fahrenheit.

CO'CHIN CHI'NA, or Ana'm, an empire of Asia, occupying the greater part of the eastern portion of the Indo-Chinese peninsula. It lies in 10°—23° n. lat., and 102°—109° e. long., including Tonquin and Cochin China Proper. It is bounded, n. by China, e. by the Gulf of Tonquin and the China Sea, s. by Lower or French Cochin China, and w. by Laos, Siam, and Cambodia. Area, 200,000 sq. m.

Physical Features.—A mountain range of considerable height runs through the country, parallel with the coast. The northern province of Tonquin is an extensive plain, through which flows the river Song-ca. C. C. Proper extends along the coast between 11° and 18° n. lat. The largest river of Anam, and indeed of the whole Indo-Chinese peninsula is the Ma-kiang or Cambodia, which, rising in the mountains of China, flows through Laos and Cambodia, and after a course of some 1500 miles, separates into several branches, and finally discharges itself into the China Sea. The Song-ca, or Great River, of Tonquin, has an estimated course of 400 miles. The Hné, in C. C. Proper, flows through a fertile valley, and presents some of the finest scenery in Asia.

As to *climate* in Tonquin, the changes of temperature and weather are very sudden. Much rain falls in C. C. during the whole summer, which produces a general inundation about the end of October. September, October, and November are the best months of the year, and most suited to the European constitution.

Amongst the *agricultural productions*, rice, of which two crops are raised in the year, holds the chief place. Potatoes, peas, beans, melons, and other vegetables, maize, tobacco, cotton, indigo, tea, and sugar, are also grown. Silk is produced in considerable quantities. Valuable trees, such as the calumba, ki-nam or scented eagle-wood, ebony, rose-wood, iron-wood, sandal-wood, the varnish-tree, and many others, flourish on the mountains. The palm-tribe and the bamboo are common in low lands. The *mineral* riches of the country are very much neglected; but gold, silver, iron, copper, and coal exist, and are most abundant in Tonquin. The *domestic* animals are the elephant, Indian cow, buffaloes, pigs, goats, dogs, and cats. Fowls of that kind so lately a rage in this country, ducks, geese, and pigeons, abound in every village. The most dreaded of the *wild animals* of C. C. is the tiger. Elephants are very numerous in the forests of Tonquin; and leopards, wolves, bears, wild-boars, the rhinoceros, as well as many kinds of apes and monkeys, infest the mountainous districts. Serpents and other reptiles are to be met with in great numbers. Of *birds*, eagles, peacocks, quails, partridges, paroquets, and wild-ducks are amongst the most important. Fish of very excellent quality swarm in the rivers and canals. Very many are taken on the sea-coast, and carried to every part of the country.

Inhabitants.—The Cochin Chinese, like the other peoples of the Indo-Chinese Peninsula, are characterised by a Mongolian physiognomy and a monosyllabic language. They are rather low in stature, but well-proportioned, hardy and active. The women have a lighter skin, and are altogether better looking than the men. Their dress is the old national costume of the Chinese prior to the Tartar conquest. The Cochin Chinese are greatly addicted to smoking, and betel-nut is the universal masticatory. The civilisation of this people has been derived from China; hence

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their religion and government, manners and customs, nearly approximate to the creeds, administrative system and habits of that country. The selection of a place of sepulture is with them a very grave consideration, and the good or bad fortune of a family is supposed to depend upon it. Rice, with a sauce called balachiam, made of macerated salt fish, is the principal food of the Cochin Chinese; but they are very unclean feeders, no flying or creeping thing, whether bat, insect or reptile, coming amiss. The national drink is tea; but a liquor made from rice is also in use. The common dwellings, which are raised two or three feet from the ground, are made of bamboo and thatch; but the better classes inhabit brick houses, roofed with tiles. Women in C. C. are allowed full liberty, and frequently engage in commerce and agriculture. They are kind to their children, and proud of a numerous offspring. Infanticide is unknown, but the poor sometimes sell the children they cannot afford to keep. Marriages are regulated by law; and before they can be contracted, the consent of the head of the family is required. Polygamy, or rather a system of concubinage, is allowed, but obtains chiefly among the rich. Divorce is also permitted. The laws against adultery are very severe, yet amongst single women little or no disgrace attends a breach of chastity. The law invests the creditor with the most arbitrary power over the property, wives and family of his debtor. The population is estimated at 21,000,000.

Government and Administration.—These are after the Chinese model. The emperor is absolute, but he must govern according to the laws. He is assisted by a supreme council of high mandarins, seven of whom are his ministers. The government officials are divided into military and civil or literary mandarins. The former have the precedency; and from them the emperor selects his ambassadors, governor generals, and viceroys. The learned and official language of the country is Chinese. For *administrative purposes*, the country is divided into provinces, departments, districts, and villages. A military governor or viceroy, and two high civil mandarins, reside at every provincial capital; and the minor divisions have each their regular number of officials, who are appointed by the supreme government. The laws are very arbitrary. The bastinado system is in full force; indeed, the bamboo may be regarded as a political and social institution. The mandarins, as a class, are described as very corrupt. The capital of the whole empire is Hué, or Huah. The foreign *commerce* of C. C. is carried on chiefly with China, the Portuguese settlement of Macao, Bankok, and Singapore. Cochin Chinese junks annually visit that port and the British Straits' Settlements.

History.—Previous to the Mongol invasion of China, Tonquin formed a part of that empire, but at that time it threw off its allegiance. The Anamitic sovereign now indeed acknowledges the emperor of China as his superior, yet his vassalage is little more than nominal. The present inhabitants of C. C. Proper are said to be descendants of political refugees from Tonquin. In 1774, a revolution in the former country deprived the reigning monarch, Ghialong, of his throne, but in 1790, assisted by some European adventurers, he not only re-established his power in C. C., but added Tonquin to his dominions. By a treaty in 1874, France guaranteed the independence of C., and obtained the opening of three ports to European commerce. —See Veuillot's "La Cochinchine" (1859); Bouillevaux's "L'Annam" (1875).

COCHIN CHINA, Lower or French, a colonial possession of France in the southern extremity of the eastern portion of the Indo-Chinese peninsula. Lat. 9° 5'—10° n.; long. 105°—107° e. This territory was acquired after a war provoked by the continuous persecution for many years of the Christians in his dominions by the king of Anam, and especially by the murder of several French and Spanish missionaries. After an invasion the three provinces of Saigon, Bienhoa, and Mytho, together with the island of Pulo Condor and a few others which lie off the coast, were taken possession of in 1861. In 1867 a new treaty, formed after the repression of formidable hostile aggressions on the part of some of the natives, led to the annexation of other three provinces—Vinhlong, Chaudor, and Haytien—thus completing the present colony of *Cochinchine française*. Area, 21,600 square miles; population (1873), 1,596,867.

Napoleon III., in urging on the vigorous war policy which led to this acquisition, had in view the tradition that France had earlier claims to be satisfied and other wrongs to be redressed, than those which induced him and the Spanish government to resolve on putting an end to the oriental monarch's persecuting cruelty. In 1787,

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Ghialong, king of Anam, in want of assistance to secure his throne, entered into a treaty with Louis XIV., by which he engaged, in return for French aid, to cede the town and harbor of Touran (Kwang-han), with its territory and two adjacent islands. The little active assistance afforded by France was effective; Ghiolong was established on the throne, and added Tonquin and Cambodia to his dominions. The promises made to France were not fulfilled, but her missionaries were protected. Of the three kings, however, who successively mounted the throne after the death of Ghialong, each excelled his predecessor in persecuting the Christians, whether Europeans or natives, and in murdering the missionaries. Tuduk, who began to reign in 1847, issued an order the same year that all missionaries should be drowned; and another in 1851, that whoever concealed a missionary should be cut in two and thrown into the river. From the time of this latter decree, the blood of his victims never ceased to flow till the sanguinary struggles which led to the establishment of the colony of Lower C. C. frightened the blood-thirsty religionists into toleration. Cambodia, a level country fertilised by the Makiang, the climate of whose plains has been compared to that of Bengal, and formerly a sort of feudal dependency on Siam, has been declared independent under the protectorate of France. In June 1864, the ruler of this country, formerly only a viceroy, was crowned in the presence of Siamese and French representatives at his capital, Houdon, assuming the name of Phra Norodon. He has accorded to France the right of forming a settlement on the Makiang or Cambodia River at the point where its four arms unite before descending to the China Sea.

Great exertions have been made by France to promote the prosperity of this colony, and to use its territorial influence in such a way as to acquire the good-will of the natives. National municipalities have been preserved; the land-tax has been lowered; and the proportion of men demanded for military service has been greatly lessened from what it was under the native princes. In 1866, a decree was issued to regulate civil marriages. Ardent hopes for the spread of Christianity are indulged in, on the ground that the natives are peculiarly open to its influences; and there has been talk of making Saigon a free port, to compete with Singapore. But that the colony pays its own expenses has not been made clear; and the French do acknowledge that their new subjects are neither industrious nor commercial. Although the resources of the country are but imperfectly developed, rice is produced in considerable abundance; cotton, sugar, indigo, and tobacco are also cultivated. The dwarf mulberry grows freely; silkworms are reared with facility; hemp, the betel-nut, and the areca-nut are likewise grown.

CO'CHINEAL, a dyestuff employed in dyeing scarlet and crimson, and in the preparation of Carmine (q. v.) and Lake (q. v.).

C. consists simply of the bodies of the females of a species of *Coccus* (q. v.), called *C. cacti*, because it feeds upon plants of the *Cactus* family, particularly on one, therefore designated the C. plant, but known in Mexico as the NOPAL (*Opuntia cochinillifera*), figured in the article CACTEÆ. This plant is nearly allied to the prickly pear. It assumes a somewhat tree-like form. Its fruit, although eatable, is very inferior to that of the prickly pear. It is a native of Mexico and other warm parts of America, and is assiduously cultivated, in order to what may be called the cultivation of the valuable insect which it supports. This cultivation was carried on by the Mexicans long before the country was known to Europeans. It is now carried on also in some parts of the West Indies, and in the island of Teneriffe. The C. plant and insect have been introduced into Algeria; but no considerable success has yet attended the attempts to introduce them into the East Indies, although the East India Company once offered a reward of £6000 for their introduction.—Other species of *Opuntia* appear to be as suitable for the C. insect as *O. cochinillifera*, particularly *O. Hernandezii*, which is employed in Mexico, and *O. Tuna*, which is chiefly used in Peru.

The C. insect is a small creature, a pound of C. being calculated to contain 70,000 in a dried state. The male is of a deep red color, and has white wings. The female, which is wingless, is of a deep brown color, covered with a white powder, flat beneath, convex above. When a plantation of the C. plant has been formed—by cuttings which are ready to receive the insect in eighteen months—the cultivator (*nopalero*) procures branches laden with C. insects; and keeping the branches, of which their succulency admits, till the mother insects have laid their eggs, he places

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their bodies, with the eggs which they cover, in little nests formed of some cottony substance upon the C. plants, and the young insects, when hatched, soon spread over them. The gathering of the C. is very tedious, and is accomplished by brushing the branches with the tail of a squirrel or other animal. The insects are killed by boiling water, by heating them in ovens, or by exposure to the heat of the sun. They must be speedily killed, to prevent them from laying their eggs, which diminishes their value. When killed and dried, they may be kept for any length of time without injury. The different appearances presented by C. as brought to market, are ascribed to the different modes of killing the insect. C. is one of the most important exports of Mexico.

CO'CHLEA. See EAR.

COCHLEA'RIA. See SCURVY-GRASS.

COCK, properly, the name of the male of the common domestic fowl (see FOWL), but very generally extended to the males of other kinds of gallinaceous birds, and not unfrequently employed as a distinctive appellation of the males even of some kinds of small birds.

The ancients regarded the domestic C. as the companion of Mars, and in heraldry he is the emblem of strife, of haughtiness, of quarrels, and of victory. Guillim has the following quaint eulogium on the cock: "As some account the eagle the queen, and the swallow or wagtail the lady, so may I term this the knight among birds, being both of noble courage, and also prepared evermore to the battle, having his comb for a helmet, his sharp and crooked bill for a falchion to slash and wound his enemy; and as a complete soldier armed cap-à-pie, he has his legs armed with spurs, giving example to the valiant soldier to expel danger by fight, and not by flight. The cock croweth when he is victor, and giveth a testimony of his conquest. If he is vanquished, he shunneth the light and society of men!" The C. is said to have been the emblem of the ancient Gauls, who wore it on their helmets for a crest; and though the tradition does not rest on the authority of any medal or other monument, and is supposed to have been a mere play of words between Gallus, a cock, and Gallus, a Gaul, the C. was placed, after the Revolution, on the flags and ensigns of France.

As the emblem of watchfulness, the image of the C. was placed on the summits of church-steeples from a very early period. It is introduced by artists amongst the emblems of our Lord's passion, in allusion to St Peter's sin, and for the same reason it is St Peter's own emblem.

COCK DIVINATION, or ALECTROMANCY, is a method of divining in which a young white cock was made the principal actor. The plan pursued was to describe a circle, and divide it into as many equal parts as there are letters in the alphabet. Upon each of the spaces marked by its respective letter, a grain of corn was placed; and the letters from which the fowl picked the grains, when put together, formed the name of the person about whom inquiry was made.

COCKA'DE (Fr. *cocarde*, or *coquarde*). According to Wedgwood, the word signified originally a cocked-hat, or a hat with the broad flap looped up on one side, and was then applied to the knot of ribbon with which the loop was ornamented. Another view is, that it is derived from *coquart*, a beau, one fond of gay trappings. The word is now, however, restricted to signify an appendage to the head-dress worn as a military or naval distinction.

Badges of distinction were early had recourse to in party and civil warfare. A sprig of broom (*planta genista*) was the badge of the House of Plantagenet. In England, during the wars between the Houses of York and Lancaster, the adherents of the former party were distinguished by a white and the latter by a red rose worn in the cap.

The party organised at the court of Charles IX. of France to perpetrate the massacre of St Bartholomew, recognized one another by a paper cross. The faction of the *Fronde*, opposed to Cardinal Mazarin, wore stalks of corn for the same purpose; and certain military bands were called *Lances vertes*, from decorating their lances with green twigs. The use of cockades, as marks of distinction in campaigns and battles, became very general about the beginning of the 18th century. Eugene and Marlborough gave the Germans, English, and Dutch, composing their army, a tuft of corn or grass as their signal or cockade. The use of the C. began

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to be more fixed in the War of Succession. White being the color of France, and red of Spain, the two colors were united in the C. of the combined army. At last, in 1767, an authoritative regulation determined that every French soldier should wear a C. of white stuff; and in 1782, cockades were prohibited to all but soldiers. From this time till the Revolution, the C. was an exclusively military badge; and, both in France and England, "to mount the cockade" was synonymous with becoming a soldier. But in the enthusiasm of 1789, the citizens of France generally assumed the tricolored ribbon as the badge of nationality and patriotism, which was soon also given to the army. The three colors were blue, white and red; white had long been the color of France and its kings; the blue is understood to have come from the banner of St Martin, and the red from the Oriflamme (q. v.). Long before the Revolution, the three colors were used in combination; they were given by Henry IV. to the Dutch, when they desired him to confer on them the national colors of his country, and have ever since been borne by the Dutch Republic and kingdom of the Netherlands. At the Restoration, the white C. of the monarchy again took its place, but had to give way once more to the tricolor, which continues to be the C. of the French army.

Black, with some distinction, enters into the cockades of the German nations. The Austrian is black and yellow; and the Prussian was black and white, abadoned for the black, yellow, and white of the German Empire. After the German war of liberation in 1813, a national C. of black, red, and gold came into general use, and was afterwards assumed by the military and by officials. The wearing of these German cockades was prohibited in 1832 by a resolution of the German Diet; but in 1848 they were again introduced, not only by patriots as a badge of German union, but into the armies. The national colors of Belgium are black, yellow, and red. Cockades of these colors were worn by almost the whole population of Brussels on occasion of the constitutional festival, July 21, 1860. Cockades of green, white, and red are worn in Italy.

The continental C. is generally in the shape of a flat disk, sometimes of metal, sometimes of silk or other stuff, with the colors disposed concentrically.

In England, the badge of the Stuarts was a white rose; and after the expulsion of the family, the white C. became the distinctive mark of the adherents of the exiled family, in opposition to the orange of Nassau and the black of Hanover; it is a favorite theme in Jacobite songs. The black C., to be seen on the hats of many gentlemen's servants, was unknown in Britain till the accession of the House of Hanover, and was then introduced by George I. from his German dominions. It seems to be understood that the right to use it belongs to naval and military officers, and the holders of some offices of dignity under the crown, including privy councillors, officers of state, supreme judges, &c. It is difficult to know where the line should be drawn, as the privilege is one of which the law takes no cognizance. It is often maintained that the distinction belongs to deputy-lieutenants, but it can hardly be supposed to extend to officers of volunteers.

COCKATOO' (*Plyctolophus*), a genus of birds of the parrot-family, or *Psittacidæ*, distinguished from parrots by the greater height of the bill, and its being curved from the base, and by the lengthened, broad, and rounded tail. The head is also large, and in the true cockatoos is surmounted by a crest of long and pointed feathers, with their tips directed forwards, which can be erected and expanded like a fan or depressed at the pleasure of the bird. The true cockatoos are also all of generally whitish plumage, but often finely tinged with red, orange, and other colors, or mixed with these colors in more brilliant display. But the name C. is also commonly extended to nearly allied genera, as *Calyptorhynchus* and *Microglossus*, in both of which the plumage is generally dark, and to which belong the *black cockatoos* of Australia and of the Indian archipelago. The genus *Microglossus*, to which belongs the Great Black C., or Giant C. of New Guinea, is remarkable for the structure of the tongue, which is cylindrical, tubular, capable of being greatly protruded from the mouth, and terminates in a cloven horny tip. All the cockatoos are natives of the regions already named. They abound in Australia. They live not only on fruits and seeds, but partly on insect larvæ. Some of them are frequently to be seen in confinement in Europe, particularly the Lesser Sulphur crested C. (*Plyctolophus sulphureus*), which, although of comparatively tame plumage, is a general favorite

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on account of its docility. None of the cockatoos learn to speak many words. Their name is derived from their own proper cry.

CO'CKATRICE, one of the fabulous monsters, a belief in the existence of which prevailed among the ancients and during the middle ages. It was sometimes distinguished from, and sometimes identified with, the basilisk. It was always regarded as possessing similar deadly powers. Its monstrous generation has already been noticed in the article BASILISK. For protection against it, travellers in Africa are said to have carried with them its relative, the cock, the crowing of which caused it instantly to expire. The word C. is sometimes used in the English version of the Old Testament. Perhaps all that can safely be affirmed of the meaning of the original Hebrew, is that it is the name of a venomous serpent. In heraldry, the C. is an imaginary monster, with the wings of a fowl and the tail of a serpent.

CO'CKBURN, Henry, a Scottish advocate and judge, was born at Edinburgh on October 26, 1779. At the age of eight, C. began attendance at the High School of Edinburgh, but exhibited no indications of extraordinary abilities. Sent to the university of Edinburgh at the age of fourteen, his powers began to develop themselves; and though never distinguished as a student, he became the companion of men like Brougham, Horner, and Jeffrey, from whom he imbibed liberal opinions, greatly to the annoyance of the hereditary Toryism of his family. He was called to the Scottish bar in 1800, and after seven years spent in becoming patience, according to the manner of his profession, he was appointed, by his relative Lord Melville, one of the advocates whose duty it is to assist the Lord Advocate in the prosecution of criminal offenders. Though the appointment was conventionally a political one, and though the party to whom C. was opposed was then in power, he was persuaded to hold the office, as it had in itself really nothing of a political character, upon the understanding that his own views were not to be compromised. It was expected, however, that he would give up his liberalism; and when this expectation was disappointed, advantage was taken, about four years after, of some trivial excuse, to dismiss Cockburn. Not till the introduction of jury trial in civil causes into Scotland in 1816, did C. find opportunity for remunerative professional employment. His powers were better adapted for success with a popular, than with a professional tribunal. Extremely simple, clear, and impressive, at times humorous, at times pathetic, always unaffected, and, when he pleased, eloquent, he urged his side of the question with so much earnestness and candor, that the effect was almost irresistible. Under the Grey ministry of 1830, he was appointed Solicitor-general for Scotland; and four years later, he was made one of the judges of the Scottish supreme civil and criminal courts, and took, according to the Scottish custom, the title of Lord Cockburn. He died 26th April 1854, at his residence of Bonaly, in the neighborhood of Edinburgh.

The efforts of C. as an author were not numerous. He contributed to the "Edinburgh Review" a few articles, having, it would seem, chiefly a temporary interest. Those upon Scottish law reform are known to have had considerable influence in producing the changes desired. Late in life, he undertook, at the request of Jeffrey's executors, the life of his beloved friend. This work was published in 1852. C. will be best remembered by the "Memorials of his Time," which appeared posthumously in 1856. It is a kind of autobiography, into which have been interwoven numerous anecdotes illustrating old Scottish life, and numerous sketches of the men who composed the brilliant circle of Edinburgh society at the beginning of the present century. A portion of the MS. kept back until a date further removed from the times of which it treats, appeared in 1874, entitled "Journal of Henry Cockburn."

CO'CKCHAFER (*Melolontha vulgaris*), a beetle of the family *Lamellicornes* (q. v.), and section *Phyllophagi* (leaf-eaters), very common in England and most parts of Europe, comparatively rare in Scotland, famous for the ravages which it commits, both in the grub state and in that of a perfect insect—the winged beetle feeding on the leaves of fruit-trees, and of many forest-trees, as the sycamore, lime, beech, and willow; the grub devouring the roots of plants, particularly of pasture-grasses and corn. The C. is fully an inch in length, of a pitchy black color, with a whitish down, giving a sort of powdered appearance; the sides of the abdomen marked by a range of triangular spots; the abdomen terminating in a point; the

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antennæ short, terminating in a club formed of six or seven leaflets; the grub is about an inch and a half long, thick, whitish, with a red head and six legs. The C. does not live long after it has passed into its perfect state, but it lives nearly four years in the grub or larva state. The female C. deposits her eggs in the earth. The ravages of cockchafers were so great in some of the provinces of France in 1783, that the government offered a premium for the best mode of destroying them. The whole grass of a field has often been destroyed in a short time by their grubs, and the beetles themselves strip off the foliage of trees like locusts. They have sometimes appeared in prodigious numbers in some places in England: the river Severn is said to have been so filled with their bodies in 1574, that the water-wheels of the mills were clogged; and in 1688, they so abounded in the county of Galway, in Ireland, that they hung in clusters on the trees and hedges like bees swarming; the noise of their countless jaws at work was heard by every traveller, and was compared to that of the sawing of timber. Rooks and other birds render great service by preventing the excessive multiplication of cockchafers. In Scotland they are called *clocks*.

CO'CKER, a small kind of spaniel, very similar to the Blenheim dog, often black. The habits and disposition are similar to those of the spaniel. The small size of the C. fits it for ranging in low and thick coverts, and it is accordingly much employed by sportsmen in pheasant and woodcock shooting; but it must not be allowed to range to any considerable distance, as it cannot be trained to wait for the sportsman, but starts the game.

CO'CKER, Edward, widely celebrated on account of his "Arithmetic," which has served as the model of almost all school-treatises subsequent to its publication, was born, it is supposed, in London about the year 1631 or 1632; and died between the years 1671 and 1675. The first edition of his famous "Arithmetic" (which was the first to confine itself to commercial questions only) was published, after his death, in 1677, by John Hawkins, who came into possession of C.'s MSS. C. was author of some other works, but his fame rests entirely on the one mentioned. The expression, "according to Cocker," became common through its frequent use on the title-pages of arithmetical treatises following his method.

CO'CKERMOUTH, a parliamentary borough in the west of Cumberland, at the confluence of the Cocker and Derwent, 95 miles south-west of Carlisle. It is delightfully situated in an agricultural district, and has a promenade a mile long along the Derwent. The ruins of a castle, founded in the end of the 11th c., stand on a bold height on the left bank of the Cocker, near its junction with the Derwent. The castle was besieged for a month by the royalists in 1648, and afterwards reduced to ruins by the parliamentarians. Near C. is a tumulus, with a Roman camp and ditch 750 feet in circuit. Many ancient relics have been found near Cockermouth. There are manufactures of linens, woollens, cottons, hats, hosiery, and paper, and in the vicinity, extensive coal-mines. Wordsworth the poet was born here. Pop. (1871) 6936. C. returns one member to parliament.

CO'CK-FIGHTING is said to have originated with the Athenians. In the earlier part of our history, since the Conquest, we find little mention of it; but it is evident that it existed in the days of Thomas-à-Becket, and until the time of the Commonwealth it flourished, the pit at Whitehall having been erected and patronized by royalty. It was prohibited in 1654, and although there have been other acts passed with the view of putting it down, it still exists under prohibition.

The greatest point considered in choosing cocks, is the breed. Formerly, there were established favorites, and very large sums were given for their chicks. Much art is said to be displayed in the training of cocks, and in trimming and preparing the cock for the combat; the fastening on of the spurs is a matter of considerable experience. Young cocks are called stags; two years is the best age. In fighting a match, a certain number of cocks to be shewn on either side is agreed upon, and the day before the match, the cocks are shewn, weighed to the greatest nicety, and matched according to their weights. Their marks are all also carefully set down, to prevent trickery. The cocks within an ounce of each other in weight are said to "*fall in*," and are matched. Those which do not fall in, are matched to fight what are called "*byes*." Those which do fall in, come into the *main*. The main is fought for a stake upon each battle, and so much for the main,

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or the winner of the most battles in the main; while the byes have nothing to do with the main, and are usually fought for smaller sums. Should the numbers be equal, so that the main cannot be decided, it is usual to separate two or more cocks which are matched to fight, and are of equal or a dead-weight, and to give or take an ounce either way with one of each of the birds which would fall into the byes, so as to make an uneven number.

A middling size is considered the best, and from 3 lbs. 6 oz. to 4 lbs. 8 oz. is the medium. Cocks sometimes fight in silver spurs, but more often in steel. The laws of fighting are very precise and particular.

To lend to brutes the means of destroying each other, and of rendering their conflicts more deadly than nature ever intended them to be, cannot be considered a spectacle calculated either to refine or to improve humanity; while the indulging in as a sport, as it is practised even in its lightest and least objectionable form, is simply cruelty. But the practices of placing a bird, that has perhaps been crippled in combat, down, without even his natural weapons, before a young stag armed, in order that the stag may be taught the art of killing, and the Welsh main, where the cocks fight until only one is left alive, are too disgustingly cruel to be thought of without indignation.

C. is prohibited by 12 and 13 Vict. c. 92. A penalty of £5 may be levied on any person keeping fighting-cocks, letting a cock-pit, or otherwise connecting himself with C., for every day that he shall so act.

COCK LANE GHOST. In the year 1762, London was thrown into a state of extraordinary excitement by the reported existence of a ghost in the house of a Mr. Parsons in Cock Lane, Smithfield. Strange and unaccountable noises were heard in the house, and a luminous lady, bearing a strong resemblance to one who, under the name of Mrs. Kemt, had once resided in the house, but who had died two years before, was said to have been seen. Dark suspicions as to Mr. Kemt having poisoned the lady were immediately aroused, and were confirmed by the ghost, who on being interrogated, answered after the fashion of the spirits of our own day, by knocking. Crowds, including Dr. Johnson, were attracted to the house to hear the ghost, and the great majority became believers. At length a plan was formed by a few sceptics to ascertain the real origin of the noises. The girl from whom the sounds were supposed to proceed was taken to another house by herself, and threatened with the imprisonment of her father in Newgate if she did not renew the rappings that evening, the noises having for some time been discontinued. She was observed to take a board with her into bed, and when the noises took place, no doubt was entertained that they had all along been produced by similar methods. A prosecution was then raised by Mr. Kemt, and Parsons was condemned to stand thrice on the pillory for imposture and defamation.

COCK OF THE PLAINS (*Tetrao* or *Centrocercus urophasianus*), the largest of the North American species of grouse. It is about one-third smaller than the European Capercailzie (q. v.), or Cock of the Woods. Its plumage is dense and soft, the prevalent color yellowish-brown, but beautifully mottled and varied with darker tints; the under parts white, with dark streaks and patches. On the each side of the neck is a large bare space, capable, when the bird struts, of being inflated into a hemispherical sac. The female is smaller, and of less showy plumage than the male, and is destitute of the neck-sacs. This bird is an inhabitant of the desolate plains on the upper parts of the Columbia, and in the interior of California, living in flocks, and often feeding so much on species of *Artemisia* that its flesh is almost too bitter to be eaten.

COCK OF THE WOODS. See CAPERCAILZIE.

CO'CKLE (*Agostemma*), a genus of plants of the natural order *Caryophylleæ*, in which the flower has ten stamens and five styles; the five teeth of the leathery naked calyx are much longer than the tube of the corolla, and the capsule is perfectly 1-celled. The common C., or Corn C. (*A. Githago*), is a frequent weed amongst crops of grain, a native of Europe or the west of Asia, but now to be found in almost all parts of the world. It is an annual plant, clothed with very long hair; with large, solitary, terminal lilac flowers. The root, stem, leaves, and seed were formerly used in medicine; the seed is still sometimes sold in Germany under the name of Black

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Cumin (Schwartzkümmel). The corn C. is a very troublesome weed in some parts of Britain, and is rare and almost unknown in others.

COCKLE (*Cardium*), a genus of Lamellibranchiate mollusks, having a shell of two equal ventricose valves, more or less of a heart-shaped appearance. The animal has two *adductor* muscles for drawing the valves closely together; its foot is remarkably large, and bent in the middle, and is capable of being suddenly straightened, so that the animal may move by a jump. More commonly, however, the foot is employed for excavating a hole in the sand or mud, in which the C. burrows; and when used for this purpose, it is distended by being filled with water. Cockles are usually gregarious, and vast numbers are found on sandy and muddy banks. The common C. (*C. edule*) is very abundant on the sandy parts of the British shores, and is one of their most valuable shell-fish, affording much palatable and nutritious human food. The number of known species is about 200; they are most numerous within the tropics, and particularly in the Indian Ocean. The genus *Cardium* is made the type of a family *Cardiadæ*, and of an order *Cardiaceæ*, which includes *Veneridæ*, *Mactridæ*, *Tellinideæ* and other families.

CO'CKNEY. This word is connected with *cocker* (Dutch, *kokeln*, to pamper; Fr. *coqueliner*, to dandle), which, according to Wedgwood, means primarily to rock the cradle, and hence to cherish, pamper. C. thus meant originally a child delicately nurtured, and was hence applied to the citizens of luxurious towns, as opposed to the hardier inhabitants of the country. The French *Pays de Cocagne*, and similar expressions among other nations, denote a Utopia—an imaginary land of luxurious abundance without labor. London has been famed for its luxury from the earliest times—a veritable Cocagne; and its inhabitants have now appropriated the name of Cockneys.

CO'CKPIT, in a ship of war, is a room near the after-hatchway, under the lower gun-deck; it adjoins the surgeon's cabin and the surgery. It contains the medicine-chests for the entire crew, and is the place where wounded men are attended to during an action.

CO'CKROACH (*Blatta*), a genus of Orthopterous (q. v.) insects, having an oval or orbicular flattened body, the head hidden beneath the large plate of the prothorax, long thread-like antennæ, and wings folded only longitudinally. The elytra are parchment-like, and the wings are sometimes very imperfectly developed, particularly in the females, as in the case of the common cockroach. The eggs of these insects are collected in a sort of shell fixed to the abdomen of the mother, which at last she deposits in a suitable situation, attaching it by a glutinous secretion. The larvæ, when hatched, discharge a fluid which softens the cement that holds together the toothed edges of a longitudinal slit in this remarkable shell, and emerging through it, at once enter upon active life. They are very similar in form to the perfect insects, and, like them, very voracious. Cockroaches are most numerous in warm countries, and even the common C. (*B. Orientalis*)—now so well known in Britain, a pest in many houses, particularly in towns, and, although not a coleopterous insect, often called the BLACK BEETLE—is said to have been imported from abroad, but its native country is uncertain. It is a nocturnal insect, concealing itself in holes during the day, and fleeing on the approach of a candle. It devours both animal and vegetable substances; and a dark-colored fluid, which it emits from its mouth, gives a disgusting smell to everything that it passes over. A tame hedgehog is of great use for reducing the numbers of cockroaches in kitchens and other places where they abound. Another excellent method of getting rid of cockroaches, is to place a washing-basin on the floor, with some treacle in the bottom. A piece of wood resting between the floor and the edge of the basin, conducts the C. to the fatal trap, from which the slipperiness of the sides of the basin prevents their exit. In this way thousands of "black beetles" may be caught in a single night. The common C. is only about an inch long, but some of the tropical ones are much larger, and are more troublesome because of their frequent use of their wings. The KAKERLAC, or American C. (*B. Americana*), a native of the warm parts of America, has found its way into Europe, and infests some seaport towns. A small species (*B. Lapponica*) is very common in Lapland, sometimes doing great injury by devouring the winter stores of salted fish.

CO'CKSCOMB (*Celosia cristata*), an annual plant of the natural order *Amarantaceæ*, a native of the East Indies, one of the most familiar inmates of our hothouses

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and conservatories, often also planted out in warm borders, especially in the southern parts of Britain. It grows with an upright stem, which becomes fattened upwards, divides, expands, and forms a sort of wavy crest covered with pointed bracts, and bearing on its surface many very small flowers, so crowded as often to present a rich velvety appearance. The colors are various, and often very brilliant.

COCK'S-FOOT GRASS (*Dactylis*), a genus of Grasses, having the panicle of flowers much on one side of the stem, its secondary branches so short that the spikelets are much crowded into clusters; the glumes unequal, the larger one keeled; each spikelet containing 2—7 florets, each of which has two lanceolate scarcely awned paleæ. This genus is closely allied to Fescue (*Festuca*), but differs in habit. The Common or Rough C. G. (*D. glomerata*), is a native of Europe, Asia, North America, and the North of Africa. It is very abundant in Britain, growing in tufts by waysides, in meadows, woods, &c., from the level of the sea to high altitudes on the mountains. It forms an important part of almost all the best natural pastures, is much relished by cattle, and grows with great rapidity after it has been cut, yielding a large quantity of herbage, and succeeding well on most kinds of soil, and in situations too shady for many other grasses. It is therefore generally sown along with other grasses. An improved variety, of greater size then the ordinary one, has been introduced into cultivation. In America, this grass is called ORCHARD GRASS, and is extensively cultivated. To this genus belongs also the TUSSAC GRASS (q. v.).

COCK'S-SPUR THORN. See CRATÆGUS.

CO'CKSWAIN, or Coxswain (pronounced *Cox'n*), on board ship, is the steersman of a boat, and commander of the boat's crew. He is expected to have his men always ready for service at short notice, and is furnished with a whistle to summon them.

CO'COA. Caca'o, or Co'co. The different kinds of C. either consist of, or are prepared from the seeds of trees of the genus *Theobrōma*.

The genus *Theobroma* (Gr. food of the gods) belongs to the natural order *Byttneriaceæ*, and contains a number of species, trees of moderate size, with large undivided leaves and clustered flowers, all natives of the tropical parts of America. It is distinguished by a 5-leaved calyx; five petals, concave at the base, and extended into a strap at the apex; the stamens united at the base into a cup, which is divided upwards into ten segments, five tips being without anthers, and the other five, alternate with them, bearing two anthers each; a thread-like style, terminating in a 5-partite stigma; the fruit a 5-angled capsule, of a substance between leathery and woody, not splitting when ripe, 5-celled, and containing many seeds in a pap-like or butter-like pulp. The seeds of several species yield more or less of the C. of commerce. By far the most important species of this genus is *T. Cacao*, to which the name C.-tree is often exclusively appropriated. It is extensively cultivated in tropical America and the West Indies, and its cultivation has been introduced into some parts of Asia and Africa. It generally rises with a bare stem to the height of only 6 or 7 feet, dividing into many branches, and attaining a height of only 16 or 20 feet altogether, although it is sometimes twice that height. The fruit is somewhat like a cucumber in shape, and is 6 or 8 inches long, yellow, and red on the side next the sun; the rind is thick and warty, the pulp sweetish, and not unpleasant; the seeds numerous, compressed, and not unlike almonds, with a thin, pale, reddish-brown, fragile skin or shell, covering a dark brown, oily, aromatic, bitter kernel, which consists mostly of the wrinkled cotyledons. These seeds are the *C. beans* of commerce; when bruised so as to be reduced to small pieces, after being shelled or decorticated, they become *C. nibs*. The C. tree produces larger seeds in cultivation than in a wild state. The tree attains its full vigor and productiveness in seven or eight years, and generally yields two principal crops in the year. When gathered, the fruit is subjected to five days' fermentation in earthen vessels or in heaps on the ground, and then opened by the hand, and the seeds dried by the sun or by fire; or it is buried for a while in the earth, till the pulp becomes rotten. The latter method is said to produce the best cocoa (*earthed C., or Cacao terré*).

C. is very nutritious. The principal constituent of C. beans is the soft, solid oil called *C. butter*, which forms more than 50 per cent. of the whole shelled bean, about 22 per cent. being starch, gum, mucilage, &c., and 17 per cent. being gluten

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and albumen. They contain also a crystallisable principle called *Theobromine*, analogous to Caffeine (q. v.), but more nitrogenous.

For dietetic use, C is prepared in several ways. It is made into Chocolate (q. v.); it is crushed into *C. Nibs*, the purest state in which C. can be purchased in shops; or the unshelled bean is powdered in a hot mortar, or between hot rollers, which yields a paste capable of being mixed with sugar, honey, starch, &c., sold in shops under the name of Soluble C., Rock C., and Common Cocoa.

C. is eaten in the solid state in the form of cakes and bonbons, or is scraped down, and treated with boiling water or milk. When C. nibs are infused with water like coffee, they yield a highly palatable beverage, which is much lighter than any other infusion of cocoa. The large quantity of oily matter present in the bean tends to make the various infusions thick and heavy, so that they do not agree with some delicate stomachs. The annual consumpt of C. is upwards of 100 millions of pounds.

An infusion of the broken and roasted shells of C.-beans is sometimes used in the same way as tea or coffee. The pulp of the fruit is eaten in the countries in which the tree grows, and a kind of spirit is obtained from it by fermentation and distillation.

CO'COA-NUT, or Co'co-nut, the well known fruit of a species of palm *Cocos nucifera*, perhaps originally a native only of the Indian coasts and South Sea Islands, but now diffused over all tropical regions. The C. palm belongs to a genus having pinnate leaves and male and female flowers on the same tree, the female flowers at the base of each spadix. The genus is further distinguished by a simple 3-celled ovary, which is succeeded by a coarse, fibrous, 1-celled drupe, two of the cells becoming abortive. There are about eighteen known species, all natives of South America except the most important, the C. palm itself. The American species prefer dry and somewhat elevated districts. The C. palm, on the contrary, is seldom found at any considerable distance from the sea-coast, except where it has been introduced by man, and generally succeeds best in sandy soils near the sea. It is always one of the first of the larger plants to establish itself in the low islands of the Pacific Ocean so soon as there is soil enough. It has a cylindrical stem about 2 feet in diameter and from 60 to 100 feet high, with many rings marking the places of former leaves, and bearing at its summit a crown of from sixteen to twenty leaves, which generally curve downwards and are from 12 to 20 feet in length. The flowers proceed from within a large pointed spathe; the fruit grows in short racemes, which bear, in favorable situations, from five to fifteen nuts; and ten or twelve of these racemes, in different stages, may be seen at once on a tree, about eighty or one hundred nuts being its ordinary annual produce. The tree bears fruit in from seven to eight years from the time of planting, and continues productive for seventy or eighty years. Of the three round black scars at one end of the shell, the one which alone can be easily pierced with a pin, and through which an opening is commonly made to get out the *milk*, is the destined outlet of the germinating embryo, which is situated there, the kernel consisting generally of the albumen (q. v.) destined for its nourishment. The thick husk is remarkably adapted to the preservation of the seed, whilst the nut is tossed about by the waves, until it reaches some shore far distant from that on which it grew.

The C. affords to the inhabitants of many tropical coasts and islands great part of their food; it is not only eaten as it comes from the tree, both ripe and unripe, being filled in a young state with a pleasant milky fluid, but is also prepared in a variety of ways, as in curries, &c.

The kernel of the C. contains more than 70 per cent. of a fixed oil, called C. Oil, or C. Butter. The oil is itself an important article of commerce, being much employed in Europe, particularly for the manufacture of *Stearine candles;* and also of a *marine soap*, which forms a lather with sea-water. In tropical countries, and particularly in the East, it is much used as a lamp oil, and as an unguent. It is also employed as an article of food, so long as it remains free from rancidity, to which, however, it is very liable. It is obtained by pressure of the bruised kernel, or by boiling over a slow fire, and skimming off the oil as it floats on the surface. A quart, it is said, may be obtained from seven or eight cocoa-nuts. It is liquid in the ordinary temperatures of tropical countries, but in colder climates, becomes a white,

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solid, butter-like oil. It becomes liquid about 74° Fahr. It can be separated by compression in the cold into a more liquid portion called *olein*, and a more solid part termed *cocoostearin*, or *cocoesin*, which is of complex constitution, and contains at least six fatty acids. C. oil is not a good lamp oil, as it chars on the wick, and burns with smoky flame. This remark applies also to the *olein* obtained from it, which, however, is used mixed with sperm oil, but it lowers the value of the sperm oil. C. oil and resin melted together yield a substance capable of being used with success in filling up the seams of boats and ships, and in tropical countries, for covering the corks of bottles, as a protection from the depredations of the white ants.

The root of the C. palm possesses narcotic properties, and is sometimes chewed instead of the areca-nut.—When the stem is young, its central part is sweet and eatable; but when old, this is a mass of hard fibre.—The terminal bud (*Palm Cabbage*) is esteemed a delicacy, and trees are often cut down for the sake of it.—The saccharine sap (*toddy*) of the C., as of some other palms, is an esteemed beverage in tropical countries, either in the state in which it is obtained from the tree, or after fermentation, which takes place in a few hours; and from the fermented sap (*palm wine*), a spirituous liquor (*arrack*) is obtained by distillation. The juice is often also in the East Indies boiled down to yield sugar (*jaggery*).

The dried leaves of the C. palm are much used for thatch, and for many other purposes, as the making of mats, screens, baskets, &c., by plaiting the leaflets. The midribs of the leaves supply the natives of tropical coasts with oars.—The wood of the lower part of the stem is very hard, takes a beautiful polish, is employed for a great variety of purposes, and is imported into Britain for ornamental joinery, under the name of PORCUPINE WOOD.—The fibrous centre of old stems is made into cordage.—By far the most important fibrous product of the C.-tree is COIR (q. v.), the fibre of the husk of the imperfectly ripened nut. The husk of the ripe nut is used for fuel, and also, when cut across, for polishing furniture, scrubbing floors, &c.

The shell of the C. is made into cups, goblets, ladles, &c., and is often finely polished and elaborately ornamented by carving.—Within the nut there is occasionally found a small stony substance of a bluish-white color, "a sort of vegetable bezoar," called in India *Calappa*, which is eagerly purchased by the Chinese, who ascribe great virtues to it as a sort of amulet to preserve them from diseases.

Cocos butyracea, one of the South American species of this genus, is a very large tree, and its nut abounds in an oil and butter of similar quality to that obtained from the cocoa-nut. The DOUBLE C. of the Seychelles Islands is the fruit of a palm of a different genus.

COCOA-NUT BEETLE (*Batocera rubus*), a large beetle of the family *Longicornes* (q. v.), tribe *Lamiariæ*, the larvæ of which are very destructive in cocoa-nut plantations, eating their way in all directions in the stems of the younger trees. They are destitute of feet, large and pulpy, and of repulsive aspect; but are esteemed a luxury by the coolies of the East. They resemble the *grugru worms* of South America.

COCOO'N, a silken envelope which the larvæ of many insects spin for themselves immediately before their transformation into the pupa state, and which serves for the protection of the inactive and helpless pupa. The name is sometimes extended to coverings formed of other materials, by agglutination or otherwise. Many insects mix foreign materials of various kinds with their silken cocoons; some caterpillars, as those popularly called *woolly bears* working into them the hairs with which their own bodies were previously covered; and others fastening together the sides of a leaf or of several adjacent leaves. Some of the moths which attach their silk to leaves, so that the leaf itself forms part of the protective covering of the pupa, proceed with a mathematical nicety as to the position and direction of their threads, more wonderful, if possible, than even that exhibited by bees in the building of their comb. The silken substance of which cocoons are made, is produced much more abundantly by some kinds of larvæ than by others; the cocoons of some being only an open network, whilst others form a compact ball. The C. of the common silk-worm exhibits externally a loose gauze-like covering, within which is a

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close and compact oval ball; yet all is of one continuous thread, which may be unwound from it 1,000 feet long. Different parts of this thread are of different qualities, but the stronger part of it may be unwound as easily as a ball of cotton. The insect works from the outside inwards, and the outer parts of the C. are produced first. The spinnerets by which the C. of the silk-worm and those of other moths are produced, are situated at the mouth of the caterpillar; but the larvæ of a few insects—not lepidopterous—have them at the opposite extremity of the body. The time occupied in spinning the C. is very various in different insects; in the silk-worm, it extends to several days.

CO'CUM OIL, a solid oil or vegetable butter, obtained from the seeds of *Garcinia purpurea*, an Indian tree of the same genus with the mangosteen. It is white or pale greenish yellow, brittle or friable, with a faint and not unpleasant odor. It melts at 95° F., but when cooled after being melted, remains liquid to 75° F. It is used for mixing with ghee (butter), and is exported to Britain for mixing with bear's grease in the manufacture of pomatum.

COCY'TUS, the name given by the ancients to a river of Epirus, fed by the snows of Pindus, and which, after a long underground course, was regarded as falling into the Acherusian Lake.—Cocytus was also the name of a river of the infernal regions, a branch of the Styx.

COD (*Gadus Morrhua*, or *Morrhua vulgaris*), a fish of the family *Gadidæ* (q. v.), almost rivalling the herring in its importance to mankind. The genus to which it belongs is distinguished by having three dorsal fins, two anal fins, and a barbule beneath the chin. The C. sometimes attains a weight of 100 lbs.; but even from a small size, it is in request for the market and the table. The roe of the female has been estimated to contain from four to nine millions of eggs, a reproductive power which seems beneficently intended to provide supply for far more extensive fisheries than are yet carried on. The C. is found in all the northern parts of the Atlantic Ocean, and in the arctic seas; it is not known in the Mediterranean. It occurs both on rocky coasts and on sandbanks, where the largest are usually caught in depths of from 25 to 50 fathoms. The productiveness of the great banks of Newfoundland excels that of all others, but the cod-fisheries near the coasts of Sweden, Iceland, and the north of Scotland are also important. The Dutch were engaged in the cod-fishery as early as the middle of the 14th c., and the English resorted for this purpose to the coasts of Iceland about the same period. The French have also engaged largely in the cod-fishery. More than 6000 European vessels are said to be employed in it, besides boats along the shores. The fishery is always carried on by means of lines and hooks, partly by *long-lines* and partly by *hand-lines*. One man has been known to catch from 400 to 550 fish, on the banks of Newfoundland, in ten or eleven hours; and eight men to take eighty-score in a day on the Dogger Bank. The C. is very voracious. Small fishes, shell-fish, &c., are used for bait. The C. is used as food, either fresh, salted, or dried. Great quantities of dried C. are carried from Newfoundland to the West Indies, and are consumed also in the Roman Catholic countries of the south of Europe. *Cod Sounds* are esteemed a delicacy, and are often salted, and so sent to market. They are also used in a dried state as isinglass. The recent discovery of the medicinal value of Cod-liver Oil (q. v.) has added to the economical importance of this fish.

ROCK C. and RED C. are names given to the common C. when its color is somewhat affected by living among weedy rocks.—BALTIC C. is a name of the Dorse (q. v.).

CO'DA, in Music, is the ending or winding-up of a composition by an extra-melodic phrase, for more completely establishing the final cadence. It may be compared to the peroration of an oratorical discourse.

CODE (Lat. *codex* and *caudex*), the primary meaning of the Latin word was the trunk or stem of a tree; latterly, it came to signify more especially wooden tablets bound together, and covered with a coating of wax, which were used for writing on. After parchment and paper were substituted for wood, the name C. was still retained. Cicero applies it to a bill; but it was not till still later, in the times of the emperors, that it was used to express a collection of laws and constitutions.

Codes, Roman.—1. *Codex Gregorianus and Hermogenianus.*—The term *codex*

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never was applied to the laws of the twelve tables, and the earliest collections so called were those of Gregorianus or Gregorius, and Hermogenianus. Of these, whether two separate collections, or two parts of one collection—a disputed point—we have only fragments. They never received the imperial authority, but they were quoted as authoritative compilations in the courts, and they supplied the models on which the subsequent works of Theodosius and Justinian were executed.

2. *Codex Theodosianus.*—This compilation was executed by a commission of eight persons, appointed by Theodosius the Younger in the year 429, and afterwards increased to sixteen. The work was completed and published, or rather promulgated, as law throughout the Eastern Empire in 438, and declared to be a substitute for all the constitutions made since the time of Constantine. In the Western Empire also, having been laid before the senate, it was confirmed as law in the same year by Valentinian III., the son-in-law of Theodosius. Nine years later, the new constitutions (*novellæ constitutiones*), which had been made since the promulgation of the C., were likewise promulgated in the Western Empire. The name of novels (*novellæ*) continued to be given to all the constitutions issued subsequent to the date of the Theodosian C. up to the overthrow of the Western Empire. The C. of Theodosius has been, in a great measure, preserved. It consists of sixteen books, which are subdivided into titles and sections. The best edition is that of J. Gothofredus (6 vols. fol., Lugd. 1665), which was re-edited by Ritter (Leip. 1736—1745). This edition contains the Theodosian C. entire, except in the first five, and part of the sixth book, for the reproduction of which the Breviary or abridgment prepared by the orders of Alaric II., king of the Visigoths—which itself may be regarded as another C.—formed the only guide. Some recent discoveries of MS. and palimpsests have added considerably, not only to our critical knowledge of the contents of this C., but have enabled us to restore several of the genuine constitutions of the first five books. Of the 262 laws and fragments of laws, which were omitted in the Breviary, 62 have been thus restored (see "Jus Civile Antejustin." Berol. 1815).

3. *Codex Justinianeus.*—In 528 the Emperor Justinian appointed a commission of ten persons, one of whom was the celebrated Tribonian (q. v.), to compile a C., incorporating in it the previous codes of Gregorianus, Hermogenianus, and Theodosius, and also the Constitutions (q. v.), Rescripts (q. v.), and Edicts (q. v.), subsequently issued. The work was performed in fourteen months, and it was then declared that the new C. should supersede the older compilations. A second edition of this work, revised and having subsequent constitutions, &c., incorporated ("Codex Repititæ Prælectionis"), is what we now know as the C. of Justinian. It consists of twelve books, divided into titles.

Gothic C.—The laws of the barbarians were all collected into a single C., which bore the title of "Codex Legum Barbarorum." Of these various systems the first was that of Alaric, king of the Visigoths, mentioned above, augmented by the legislative labors of his successors. To this C. was given the title of the Gothic law, *par excellence*, and it was the best and fullest of all the barbarian codes. The second C. comprised in the collection was that of the Burgundians; the third, the Salic Law (q. v.), composed when the Franks issued from their German forests; the fourth, the law of the Frisians, which dates from the times of their conquerors, Pepin and Charles Martel. These and all the other codes by which the tribes of the north which overthrew the Empire were governed, merged at last in the feudal system, and a mass of local customs speedily arose which introduced the greatest uncertainty into jurisprudence.

French Codes.—Charles VII. was the first of the kings of France who attempted, by a series of general *ordonnances*, to introduce something like uniformity into the legislation of France; and several of his successors, in particular, Louis XI. and Henry III., entertained the idea of establishing a single C. for the whole kingdom. A C., having this object in view, was subsequently prepared by Michel de Marillac, and published in 1629. It consisted of 471 articles, and is spoken of by French jurisconsults in terms of the highest praise. Its reception, however, was very partial, confined indeed to the jurisdiction of the parliament of Dijon. Louis XIV., who, amongst his other ambitions, affected that of becoming the French Justinian, published a series of very important ordonnances, embracing most of the leading departments of the law. The work was executed by a commission composed of the most distinguished magistrates and advocates of the kingdom, and before the various ordonnances received the royal assent, the king caused them to be dis-

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cussed with the principal officers of parliament. Minutes of these discussions have been preserved, and they constitute one of the most precious monuments of the history of French jurisprudence. Many important chapters were subsequently added to this C., before it assumed the form in which, as the C. of Louis XV., it represents the condition of French jurisprudence previous to the Revolution.

Such, with the addition of sundry attempts at legislation during the period of anarchy which succeeded, was the position of affairs when Napoleon assembled that brilliant band of jurisconsults—Tronchet, Portalis, Merlin, Bigot-Préameneu, Treilhard, Pensey, &c.—by whose labors, aided in no insignificant degree by that marvellous insight into human affairs which he himself possessed, the modern legislation of France, and of no small portion of the rest of Europe, was called into existence. Such was the energy which he contrived to bring to bear on the work, that the vast edifice of the C. Napoleon, or C. Civil, was reared in a single year, the first title having been promulgated on 5th March 1803, and the last on 30th March 1804. The C. de Procédure Civile followed in 1806, the C. de Commerce in 1807, the C. d'Instruction Criminelle in 1808, and two years afterwards, the C. Pénal. The period of the Restoration produced several codes of less importance—forest-laws, fishing-laws, &c. The C. Napoleon received the force of law in the countries which were successively subjugated by France; in Italy, in the kingdom of Holland, in the Hanseatic departments, in the grand duchy of Berg. In the Rhenish provinces and in Belgium, it still forms the basis of legislation. Several other countries have since codified their legislation, in most cases adopting modifications of the C. Napoleon.

CODEX (pl. Codices: for derivation see preceding article), the same applied to ancient manuscript copies of the Scriptures.

CO'DICIL, a supplement to a will, whereby anything omitted is added, or any change demanded, by the altered circumstances of the testator or the beneficiaries, is effected. A C. is authenticated in the same manner as a will, and possesses the same privileges when holograph, or written by the hand of the testator himself. See TESTAMENT, WILL.

CODIFICA'TION, the act of forming a Code (q. v.), or systematic collection of laws. Though a code, in the wider sense, comprehends frequently the whole legislation of a country, there is a narrower sense in which the term is applied to a particular branch of legislation, such as commercial law, criminal law, marine, &c. In this latter sense, some of our general acts of consolidation, such as the Merchant Shipping Act of 1854 (17 and 18 Vict. c. 104), may almost lay claim to the character of codes. All attempts at C. in the wider sense in England have failed, notwithstanding the earnest advocacy of Lord Brougham. The department in which it seems to be most hopeful is the law-merchant, in which, being necessarily cosmopolitan beyond the other departments of the law, great benefit may be derived from the labors of our continental neighbors. See CODE.

CO'DLIN, the name given to a number of varieties of apple, chiefly used for culinary purposes. Some of them are in high repute in Britain, both on account of the quality of the fruit and the productiveness of the tree. The fruit cannot easily, however, be kept long. In most of the varieties which bear this name, it is large and somewhat conical. The trees are often propagated by layers or suckers, or even by slips, plants thus obtained becoming fruitful much sooner than grafted trees.

CODLIN MOTH (*Tyralis pomona*), a small moth which is very injurious in apple-orchards in some parts of Britain, laying its eggs in the eyes of the newly formed fruit, within which the larva feeds, so that the growth of the fruit is arrested, and it falls prematurely off. This moth is one of the *Tortricidæ*, agreeably colored, with rather short and broad wings. The caterpillar has sixteen feet.

COD-LIVER OIL is generally obtained from the livers of the common cod (q. v.), but likewise from allied species, as ling, dorse, coal-fish, torsk, &c. In these fish, the adipose tissue (q. v.) containing oil is almost entirely confined to the liver, in which they agree with the shark tribe, whilst in other fish, as in the herring and salmon, the oil is diffused over the entire structure of the animal. C. O. is prepared largely in Britain, Norway, and Newfoundland. There are three varieties of the oil sold in commerce—*pale C. O.*, *pale-brown C. O.*, and *dark-brown Cod-liver Oil*.

In the preparation of the oil, the livers are placed in a tub with a layer of spruce

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boughs at the bottom, and subjected to pressure, when the light-colored or pale oil exudes, and is run off by an opening at the lower part of the tub. As the livers partially putrefy, more oil escapes, which is darker than that procured from the fresh livers, and constitutes the pale-brown oil; whilst the residual livers being boiled with water, part with the remaining oil they contain, and yield the dark-brown oil. The pale oil thus approaches more nearly the condition in which the oil is present in the livers, while the other varieties are more or less impregnated with the products of the putrefaction of the livers. The purer oil has a peculiar fishy odor and taste, which is not disagreeable, although it remains for a little time, and in some cases requires a little practice to get accustomed to it. The darker varieties have more or less of a disagreeable empyreumatic odor and taste, and leave in the throat an unpleasant nauseous sensation, more difficult to overcome.

The oil mainly consists of oleic and margaric acids, in combination with glycerine, and holding in solution the constitutents of the bile, acetic acid, a phosphorised oil, as also iodine and bromine. These ingredients are most largely present in the light colored oil. C, O. is occasionally adulterated with more or less train-oil, to which a little iodine has been added. In the purer varieties of C. O., the presence of any such admixture can be at once observed from the disgusting odor, although in the darker varieties of C. O. the test of odor cannot be relied on.

As a remedy, C. O. has a great reputation as efficacious in the treatment of scrofulous and tubercular diseases, and especially in Consumption (q. v.); it has also been used extensively in chronic rheumatism, in rickety affections, and in other diseases of the bones and joints. The virtues of C. O. have been ascribed to iodine, bromine, and other specific ingredients; but, on the whole, the most probable view of its action is that it is simply a fattening agent—a fatty food—and that it acts by nourishing the system in cases attended with emaciation, just as new milk, cream, and butter, or fat bacon, will sometimes act in similar cases. C. O. is often found to be more easily digested than, from its somewhat disagreeable odor and taste, might have been expected. Children, in particular, often take it readily; and in emaciated old people, it is sometimes of great service in conjunction with remedies suited to the peculiar character of the case. In true tubercular consumption, it has for some years enjoyed a great reputation; but it is very far from having anything like a specific remedial action in that disease. C.O. is commonly taken in doses of from a dessert-spoonful to a table-spoonful three times a day; but a pint, or even more, is said to have been consumed daily in some instances with good effect, or at least without injury.

CODO'GNO, a town of Lombardy, Northern Italy, situated in a rich district between the Adda and the Po, about 15 miles to the south-east of Lodi. It is well built and has manufactures of silk and linen, and a great trade in cheese. Pop. 9632.

CO'DRINGTON, Sir Edward, G. C. B., &c., a distinguished British admiral, third son of Edward Codrington, Esq., was born in 1770, and entered the navy in 1783. In 1794 he was lieutenant of the *Queen Charlotte*, Lord Howe's flag-ship, in the actions of the 28th and 29th May and 1st June. At the battle of Trafalgar, in 1805, he was captain of the *Orion*, 74. He afterwards served in the Mediterranean, and in North America, and rose to the rank of vice-admiral in 1821. In November 1, 1826, he was appointed commander-in-chief of the Mediterranean squadron, and in that capacity took the leading part in the battle of Navarino (q. v.). In reward for this victory he received the Grand Cross of the Bath, with Russian and French orders; but the battle being considered an "untoward event," C. was recalled. He attained the full rank of admiral of the red in 1837 and in 1839 was appointed commander-in-chief at Portsmouth. He was M. P. for Devonport from 1832 to 1839. He died April 28, 1851.—His son, GENERAL SIR WILLIAM JOHN CODRINGTON, G. C. B., was commander-in-chief in the Crimea, 1855—1856; and was promoted to the rank of general in 1868. The brother of the last mentioned, ADMIRAL SIR HENRY JOHN CODRINGTON, K. C. B., took part in the destruction of St Jean d'Acre, and became an admiral in 1867.

CO'DRUS, the last king of Athens, was the son of Melanthus, and, according to Grecian legend, sacrificed his life for his country about the year 1068 B. C. A war raging between the Athenians and Dorians, the oracle declared that the victory should belong to those whose king was slain by the enemy; whereupon, C., attiring

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himself as a peasant, entered the Dorian camp, and having picked a quarrel with some of the soldiers, contrived to have himself slain. His son, Medon, was made Archon (q. v.) for life, on the pretense that no one was worthy to succeed such a man as king. The accounts, however, which have come down to us, indicate that the sons of C. had quarrelled about the succession after their father's death, and it is more probable that the aristocratic families (the Eupatrids) took advantage of the opportunity presented to them, of diminishing the regal authority by abolishing the name.

CO-ĔFFI'CIENT (Lat. together-making) is the name given in Algebra to the known or constant factor of an unknown or variable quantity. Thus, in the expressions $4x$ (4 times x), bz (b times z), 4 and b are coefficients of x and z, b being supposed known as well as 4, and x and z unknown or variable. Strictly speaking, in a product, such as 8×5, $4 \times x$, or $b \times z$ ($= bz$) either of the two factors is a C., since they "together make" the product; but in practice, the meaning is restricted as above explained.

COEHOORN, or Cohorn, Menno, Baron van, called the Dutch Vauban, was born at Lettingastate, near Leeuwarden, in 1641, and studied fortification and mathematics under his uncle Bernardus Fullenius, then professor of these sciences at Franeker. Prince Henry Casimir, Stadtholder of Friesland, apprised of the youth's great abilities, appointed him in his sixteenth year, captain of a company of infantry; and in 1674 C. greatly distinguished himself at the siege of Maestricht, and in various battles. At the siege of Grave, in 1674, he demonstrated that small portable mortars might be advantageously employed (see next art.); and also that the combined effect of a certain mass of projectiles is much greater than the effect produced by a successive discharge of the separate projectiles composing the mass. The application of this principle distinguishes the operations of Coehoorn. C. covered himself with honor before Kaiserswerth (June) and Bonn (October 1689), and the Elector of Brandenburg wanted to make him major-general, a promotion he refused. He also distinguished himself in the battle of Fleurus (July 1, 1690). He was now for some time in disgrace, but was soon sought again by William III. He fortified Namur, and defended his own intrenchment "William" again Vauban in 1692; besieged that fortress in 1695, and retook it; was appointed lieutenant-general and director-in-chief of the Dutch fortifications, and fortified several towns, of which Bergen-op-Zoom may be considered his master-piece. In 1702 he annihilated the French lines near St. Donat. He died at the Hague, March 17, 1704. His principal works are, "The New System of Fortication" (Leeuwarden, 1685) and "The Pentagon."

COE'HORNS—named from the military engineer who invented or introduced them—are small howitzers or mortars, generally 4 2-5 inches calibre. These implements of war, being easily moved and adjusted, and taking little powder, are found very useful in sieges, if grouped in great number. A battery of 30 or 40 C., by pouring their small shells or grenades into the outworks of a fortress, may prevent the garrison from effecting a strong occupation, or making a demonstration.

CŒ'LELMI'NTHA (Gr. hollow worms), the name given by Owen to one of the two orders of Entozoa (q. v.), or Intestinal Worms, consisting of those which have a distinct abdominal cavity and intestinal canal, the *Vere intestinaux cavitaires* of Cuvier. Examples of this order are *Ascaris*, *Strongylus*, and *Filaria*.

CŒ'LE-SY'RIA (Hollow Syria), now called by the natives El-Bŭkâ'a, "the deep plain," a valley of Syria, extending between the ranges of the Lebanon and Anti-Lebanon. Near Bar Elias, it is 2864 feet above the sea. Its length is about 100 miles, and its average breadth 10. In this valley stand the ruins of Baalbek and the village of Zahleh.

CŒ'LIAC A'XIS. See AORTA.

CŒ'NOBITES (Gr. *koinos*, common, and *bios*, life), or syncdites, the name given to those monks who live together, in contradistinction to the Anchorites (q. v.), or hermits, who withdraw from all society, and live in a solitary fashion. The first *Cœnobium*, or monastery, was founded by Pachomius, a disciple of St Anthony, about the year 340 A. D., at Tabennæ, an island in the Nile. In a short

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time, it reckoned 1300 monks, and stimulated the establishment of numerous other monasteries in Egypt, Syria, and Palestine.

CŒNU'RUS. See CESTOID WORMS.

CO'FFEE. This well-known beverage is an infusion of the roasted albumen of the seeds of the C. tree (*Coffæa Arabica*), a native of Abyssinia and Arabia, but now naturalized in many of the tropical countries colonised by Europeans. There are a number of species of *Coffæa*, but this one only is known to possess valuable properties; the seeds of *C. Mauritiana* prepared in the same way, are bitter and slightly emetic. The genus belongs to the natural order *Cinchonaceæ*. It has a tubular 4—5 cleft corolla, and a succulent fruit containing two cells lined with a cartilaginous membrane, and each containing one seed.

In a wild state, the C. tree is a slender tree of 15—25 feet high, with few branches; in cultivation, it is seldom allowed to become more than 6—10 feet high, and is made to assume a sort of pyramidal form, with horizontal branches almost from the ground. The leaves are evergreen, opposite, very shining, oblong, and leathery; the flowers are small, clustered in the axles of the leaves, and snow-white; the whole appearance of the tree is very pleasing; and the smell of the flowers is delicious. The fruit, when ripe, is of a dark-scarlet color, and the seeds are semi-elliptic, and of a horny hardness. The seeds are commonly termed *C. Beans*, but this name is not derived from a resemblance to beans, which they have not, but from the Arabic word *bunn*. They are sometimes, but very incorrectly, designated *C. berries*.

The C. tree succeeds only in countries where the average temperature of the year is about 64—70° F. In Peru and Quito, it is acclimatised at an elevation of 6000 feet, where, however, frost never occurs; but as it delights in a moist atmosphere, it nowhere thrives better than in tropical islands. The fruit ripens in the hothouses of Britain, where the C. tree frequently flowers. C. plantations are laid out pretty much in the same way everywhere. In quadrangles, bordered by fruit-trees, the C. trees stand in rows; they are pruned the to same height, and the ground between them is carefully kept clear of weeds. Where the climate is dry, abundant irrigation is necessary, but the supply of water is cut off as the fruit begins to ripen, in order to the improvement of its quality. The tree yields its first crop in the third year; the crop from a full-grown tree may amount to a pound of C. beans. As the C. tree continues flowering for eight months, its fruits are at any time of very unequal ripeness; in the West Indies and Brazil, three gatherings are therefore made annually. The beans are placed on mats or large floors specially adapted for the purpose, where they are dried by the sun's rays, being meanwhile frequently turned. They are passed between rollers to remove the dried pulp of the bean, and the membrane which encloses the seeds themselves, and the C. is afterwards freed from impurities by winnowing, and conveyed in bags to the seaports. As equal care is not, however, bestowed upon the preparation of it in all places where it is cultivated, there are great differences in quality and price.—The earlier history of the C. tree is not very clear. It was not known to the Greeks or Romans; but in Abyssinia and Ethiopia it has been used from time immemorial; and in Arabia it was certainly in use in the 15th c., and over the rest of the East in the 16th century. Towards the end of the 17th c., it was carried from Mocha to Batavia by Wieser, a burgomaster of Amsterdam, where it was soon extensively planted, and at last young plants were sent to the botanical garden at Amsterdam, from which the Paris garden obtained a tree. A layer of this was carried out to Martinique in 1720, where it succeeded so well, that in a few years all the West Indies could be supplied with young trees.

The following sorts are particularly distinguished from each other in commerce. *Mocha C.*, which comes from Arabia, and is known by its small gray beans inclining to greenish; *Java* or *East Indian C.*, which has large yellow beans; *Jamaica C.*, with beans somewhat smaller and greenish; *Surinam C.*, which has the largest beans; *Bourbon C.*, with beans pale yellow and almost whitish.

The employment of C. as a beverage was introduced from Arabia, in the 16th c., into Egypt and Constantinople. Leonhard Rauwolf, a German physician, was probably the first to make C. known in Europe, by the account of his travels printed in 1573. Soon after the first introduction of C. COFFEE-HOUSES arose almost everywhere. The first in Europe was established in Constantinople in 1551. In London,

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the first coffee-house was opened in Newman's Court, Cornhill, in 1652, by a Greek named Pasquet. This Greek was the servant of an English merchant named Edwards, who brought some C. with him from Smyrna, and whose house, when the fact became known, was so thronged with friends and visitors to taste the new beverage, that to relieve himself from annoyance, Edwards established his servant in a coffee-house. The first coffee-house in France was opened at Marseille in 1671, and in 1672 there was one opened in Paris, which soon had several competitors.

In Arabia and the East, C. is not usually prepared as a beverage in the same way as in Europe, except by Europeans. A decoction of the unroasted seeds is there generally drunk; and for the "Sultan's Coffee," the pericarp with the dried pulp roasted, is employed.

The great demand for C. has led to the employment of a number of cheaper substitutes, of which *Chicory* (q. v.) root is the best known in this country. Of others, dandelion root, carrot, and the seeds of the common yellow iris may be mentioned. They are prepared by roasting like coffee. The seeds of *Astragalus Boeticus*, already mentioned in the article ASTRAGALUS, are known on the continent of Europe as *Swedish C.*, and are said to be the best substitute for C. yet discovered. But all these substitutes want the most important constituent of the true C., *caffeine*; and are therefore very different from it in their qualities. C. is subject to great adulteration, most of the articles specified as substitutes being employed for this purpose. The chief substance of mixture, however, is chicory, the use of which for this purpose was legalised by a Treasury minute in 1840. This adulteration was prohibited by a Treasury minute of 1852; but it being found impossible to make the prohibition effectual, a minute was passed in the succeeding year, permitting the mixture and sale of C. and chicory, on condition that the parcels containing it were labelled in conspicuous letters *Mixture of Coffee and Chicory.*

The leaves of the C. tree are used in the western part of Sumatra instead of the seeds. They are prepared by quick drying in a manner similar to that in which tea-leaves are prepared; and in this state contain even a larger proportion of caffeine than the C. beans of our shops. It seems not improbable that the use of the C. leaf may yet extend very much.

C. owes its exhilarating and refreshing properties to the presence of three substances: *Caffeine* (q. v.); which occurs in the roasted bean to the extent of ¾ to 1 per cent.; 2. A *Volatile oil*, which is not present in the raw bean, but is developed during the process of roasting to the extent of only one part in about 50,000 of the roasted C.; and 3. Astringent acids, resembling tannic acid, but called Caffeo-tannic and Caffeic acids. The average composition of unroasted C. is as follows:

Caffeine	0·8
Legumin (vegetable caseine), (q. v.)	13·0
Gum and sugar	15·5
Caffeo-tannic and Caffeic acids	5·0
Fat and volatile oil	13·0
Woody fibre	34·0
Ash	6·7
Water	12·0
	100·0

When the beans are roasted till they assume a reddish-brown color, they lose 15 per cent. by weight, and gain 30 per cent. in bulk; when further roasted till they become chestnut-brown, they have lost 20 per cent. by weight, and increased 50 per cent. in bulk; whilst if the roasting is continued till the beans become dark-brown, they lose 25 per cent. in weight, and acquire 50 per cent. in bulk. The beans should never be darker than a light-brown color, which is quite sufficient to bring out the excellent aroma and other qualities of the C.; and when the roasting is carried further, more or less charring is the result, and a disagreeable burned smell is produced, which tends to overcome the natural pleasant aroma.

C does not retard the action of the bowels, as strong infusions of tea tend to do, partly because there is less of the astringent principle, and also owing to the presence of the aromatic oil which tends to move the bowels. The important offices which C. fulfils are, to allay the sensation of hunger; to produce an exhilarating and refreshing effect; and, most important of all, to diminish the amount of wear

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and tear, or waste of the animal frame, which proceeds more or less at every moment. See NUTRITION. The grounds of C. are very nutritious, from containing so much legumin; and some of the eastern nations take advantage of this, and use the grounds as well as the infusion. In other respects, C. possesses similar properties to Tea (q. v.).

An endless variety of apparatus have been contrived—some of them of great complexity—for preparing C. for the table. The chief object aimed at is, to obtain the liquor free from all sediment. One of the simplest and cheapest of these contrivances is the percolating C.-pot. The easiest way of making C.—requiring no special apparatus, and as satisfactory in the result perhaps as any—is to put two ounces of (fresh-roasted and fresh-ground) C. into a small saucepan or common C.-pot; pour over it a pint of boiling water, and allow it to stand, closely covered up, by the side of the fire (but *not* to boil) for five minutes. The liquor may then be simply poured off the grounds, or it may be strained through a cloth, and then returned to the saucepan or C.-pot (previously rinsed out), and warmed again. Soyer recommends, that before the boiling water is poured in, the saucepan should be set dry on the fire, and the powder stirred till it is quite hot, but not in the least burned. In France, a pint of boiling milk is added to a pint of coffee. The chief effect of adding chicory to C. is to deepen the color.

ESSENCE OF COFFEE is a highly concentrated infusion, mixed to the consistence of treacle with extract of chicory and burned sugar, and kept in well-corked bottles. By pouring boiling water upon a tea-spoonful of the essence, a cup of very tolerable C. may be prepared in a moment.

The trade in C. is of great importance. The following statement is given in "M'Culloch's Commercial Dictionary" as "a pretty fair estimate" of the comparative exports of C. from the principal places where it is produced, and of the annual consumption in those countries into which it is imported from abroad:

EXPORTS.

	Tons.
Mocha, Hodeida, and other Arabian ports	8,000
Java	55,000
Sumatra and other parts of foreign India	8,000
Brazil and the Spanish Main	160,000
Hayti	16,000
Cuba and Porto Rico	7,000
British West India colonies	2,000
India and Ceylon	38,000
Dutch West Indies	2,000
French West Indies and the Isle de Bourbon	2,500
	298,500

CONSUMPTION.

	Tons.
Great Britain	16,000
Netherlands and Holland	40,000
Germany, Russia, and countries round the Baltic	60,000
France, Spain, Italy, Turkey in Europe, the Levant, &c.	55,000
The United States	90,000
Canada, Australia, &c.	30,000
	291,000

In 1876, the total quantity imported into the United Kingdom was 1,341,378 cwts., of which 792,915 cwts. were imported from Ceylon and other British possessions, the computed real value being £6,412,782, or about 10*d.* per lb. The quantity retained for home consumption during this year was 297,699 cwts., on which a duty of 14*s.* per cwt. in the raw state, and 2*d.* per lb. in a kiln-dried, roasted, or ground condition, was leviable.

COFFEE BUG (*Leanium Coffeæ*), an insect of the Coccus (q. v.) family, which lives on the coffee-tree, and is often extremely destructive to coffee-plantations. It has of late years devastated some of these in Ceylon. To check its ravages, the experiment was tried of introducing into the plantations the red ant (*Formica smaragdina*), abundant in many of the gardens and jungles of the island, which feeds

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greedily on the C. B.; but the fierce assaults of the ants on the naked skins of the Malabar coolies, made them threaten to leave the estates.

CO'FFEE-TREE, Kentucky. See GYMNOCLADUS.

CO'FFER, in Fortification, is one particular kind of *Caponnière* (q. v.).

COFFER, a deep panel in a ceiling, also called a caisson.

COFFER, a casket for keeping jewels or other valuables. Caskets and chests were sometimes made of iron, but more frequently of wood.

CO'FFERDAM, a water-tight structure used in engineering for excluding the water from the foundations of bridges, quay-walls, &c., so as to allow of their being built dry. Cofferdams are generally formed of timber piles driven close together (called sheeting) in two or more rows, according to the depth of water and the nature of the bottom, the space between the rows, which may vary from four to ten feet, being spooned out down to the solid and impervious bottom, and filled up with clay puddle. Sometimes they are made of only one row of piles of the full height, calked above low-water, with a low or dwarf row outside to confine the puddle up to that level, or, where there is no wave or current, with a mere bank of clay thrown against the outside; and occasionally the upper work is formed of horizontal planking, fixed on open main piles, and calked in the joints. When the bottom is rock, so as to prevent piles being driven, and is not much below low-water, cofferdams are occasionally formed of two stone-walls, with a space between filled with clay.

The cofferdams before spoken of are all what are called high-water dams, and exclude the water at all states of the tide. They require to be provided with sluices, to allow of the water, when first to be excluded, getting out during the ebb, and to shut against it during the flood. The remainder of the water, and all leakages, must be got rid of by pumps generally worked by a steam-engine. For moderately shallow foundations, and more especially where there is a great rise and fall of tide, tidal-dams are often used. These are some times made of sheeting piles, but are often boxes formed of planking or of iron, weighted and sunk into the ground by digging inside in the same way that wells are sunk. These dams can only be used for a couple of hours or thereabouts at low-water, and, of course, require to be pumped out every tide. All cofferdams require to be strongly shored within, to prevent their being forced inwards by the pressure of the external water; and the rows of piles require to be strongly bolted together, to overcome the pressure of the clay puddle, which otherwise would burst them.

CO'FFIN (Lat. *cophinus*, Gr. *kofinos*, in both languages signifying a basket, coffer, or chest, but never a coffin). In the ordinary English sense of the word, a C. is a chest or box in which dead bodies are buried or deposited in vaults; but the the term is also applied to a mold or paste for a pie, and in Printing, to the wooden frame which encloses the stone on which the form is imposed. In farriery, it signifies the hollow part of a horse's hoof. It is in the first of these significations alone that we shall consider it here.

It has been keenly disputed amongst scholars, whether it was more usual with the Greeks to bury their dead or to burn them (see BURIAL); but both customs unquestionably prevailed, and coffins, in the modern sense, were consequently known in Greece. They were called by various names (*soroi*, *pûeloi*, &c.), and composed of various materials, the most common being baked clay, or earthenware. Their forms also varied, sometimes resembling those which we use, sometimes consisting of a narrow triangular box, the undermost side of course being considerably broader than the others. In Rome, the ancient practice was to bury the dead, not to burn them; though under the Empire, and previous to the recognition of Christianity, the latter custom became almost universal. The C. in Rome was called *area* or *loculus*, and was frequently made of stone, sometimes of a peculiar kind of stone brought from Assos, in Troas, which was said to consume all the body except the teeth in forty days, and which, from this circumstance, was called sarcophagus—an eater of flesh. See SARCOPHAGUS. Many Roman stone coffins have been found in this country. The simplest of all coffins was that used by the British Celts and other rude nations, consisting of unhewn stones set on their edges, so as to cover the sides and ends of the grave, one or more flat stones being then laid over the body

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to form a lid. To these succeeded stone-coffins, which were commonly used for persons of the higher classes in Saxon times, and throughout the whole of the middle ages.

From Bede, however, we learn that the Saxons occasionally employed wood; and the common people, both then and in the subsequent Norman and English eras, were simply wrapped in cloth, and so put into the ground. The same custom seems to have been followed with monks down to a comparatively recent period. Stone-coffins were generally of a single block, commonly tapering from the upper end. In the hollow for the reception of the body, there was generally a part peculiarly fitted for the head, and a hole in the bottom to allow of the juices of the decaying body to escape. These coffins, for the most part, were not buried deeply in the earth, and were frequently placed so near the surface that the lids were visible, which, within a church, often formed part of the pavement. Sometimes they were even above the ground altogether, and thus became the originals of altar-tombs. These lids were often covered with elaborate sculpture, representing crosses and other ornaments. Leaden coffins were occasionally used in the middle ages, as those recently brought to light in the Temple Church in London testify, but the slight wooden cases now in common use appear to be of comparatively recent origin. See Strutt's "Manners and Customs," and Gough's "Sepulchral Monuments."

CO'GGESHALL, a town in the north-east of Essex, on the left bank of the Blackwater, 44 miles north-east of London. It lies partly on low ground, near the river, and partly on some gentle ascents rising from it. There is an endowed grammar-school, founded by Sir Robert Hitcham. The church is one of the finest in Essex, and has been recently restored at great cost. It has manufactures of silk, velvet, and isinglass. Pop. (1871) 2916. It is supposed to have been the Roman *Canonium*, and the remains of a Roman villa have been found. It has the ruins of a Cistercian abbey, founded by King Stephen in 1142.

COGNAC, a town of France, in the department of Charente, with a pleasant situation on an old castle-crowned hill overlooking the river Charente. C. is celebrated as the place where the best brandy in France is manufactured, to which it gives its name. Not half the quantity of so-called *Cognac* brandy, however, is manufactured here. The cultivation of the vine and distillation of brandy form the chief industry of the inhabitants of the district. Francis I. was born here. Pop. (1872) 12,761.

CO'GNATE. See AGNATE.

COGNI'TION and Sa'sine, in Scotland, a form of entering an heir in burgage property. See CONVEYANCING.

CO'GNIZANCE, a term used in a loose manner in Heraldry, sometimes to signify a Crest (q. v.), sometimes a Badge (q. v.), or other distinguishing mark.

COGNOSCE'NTI (Ital., from Lat. *cognosco*, to know), persons professing a critical knowledge of works of art, and of a somewhat more pretentious character than amateurs.

COGNO'VIT—viz., *actionem* (he has confessed the action) in the law of England, is the defendant's written confession that the plaintiff's cause against him is just and true. A C. usually proceeds on the condition that defendant shall be allowed a certain time for the payment of the debt or damages and costs; and it impliedly authorises the plaintiff's attorney to do everything necessary to obtain judgment.

COHABITA'TION, in the law of Scotland, means living at bed and board together, like man and wife, and being reputed to be such. These circumstances, when fully established, are held to afford sufficient proof that the contract of marriage between the parties has actually been constituted by their mutual consent.

CO-HEI'R and Co-hei'ress, one of two or more persons, among whom an inheritance is divided. See HEIR, SUCCESSION.

COHE'SION is the name given to that species of Attraction (q. v.) by which the particles of matter are held together so as to form bodies (see ADHESION) and its measure is the resistance which bodies offer to any mechanical force tending to separate their parts. In gaseous bodies, C. is altogether wanting; their atoms even repel one another. In liquids, notwithstanding the ease with which the particles

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slide on one another, the operation of C. is distinctly seen in the formation of drops. C. is strongest in solids; and degrees of C. in this case, are much the same thing as degrees of solidity. It is the force of C. that constitutes the strength of materials (q. v.). After the particles of a body have been completely separated, it is found that through C. they will reunite, if pressed sufficiently close together. Two clean, smooth, freshly cut pieces of lead placed together, will cohere so as to require a very considerable force to separate them; and it has not unfrequently happened in plate-glass manufactories that polished plates of glass have cohered so completely that they have been cut and worked as a single piece.

If the particles of matter had no property in relation to one another except their mutual impenetrability, the universe, it has been said, would be like a mass of sand, without variety of state or form. As it exists, however, it demonstrates the cross action of several universal properties of matter. Among those which most affect its state and form, are heat and cohesion. It may be said that bodies assume the solid, liquid, or aëriform states, just according to the proportion that the C. of their particles bears to those forces which, like heat, tend to separate them. See HEAT. Upon modifications of the cohesive force, and its relations to other molecular forces would seem to depend such properties as elasticity, brittleness, ductility, &c.

COHESION-FIGURES, a remarkable class of figures produced in liquids by the action of their natural cohesive attraction for the surfaces of other liquids or solids on which they are deposited, or by induced cohesive attraction effected by the means of electricity. They may be described under four heads: (1) The Surface-cohesion Figures of Tomlinson; (2) The Submersion-figures of Tomlinson; (3) The Breath-cohesion Figures of Strethill Wright; (4) The Electric-cohesion Figures of Strethill Wright.

1. *The Surface-cohesion Figures of Tomlinson.*—This class of figures was submitted to the Chemical Section of the British Association by Mr. Charles Tomlinson of King's College, London, in 1861. He shewed that a drop of an "independent liquid," such as an oil, alcohol, or ether, when gently placed upon chemically clean water, spreads itself out into a definite figure as it enters into solution or diffuses itself over the surface. He stated that each figure is characteristic of the fluid employed, and that any change in the chemical or molecular state of the fluid is attended with a corresponding change in its "cohesion-figure." Hence he recommended that these figures should be applied to the qualitative analysis of various liquids whose ordinary methods of testing were inoperative or inadequate. *Cohesion analysis*, performed as he directs, has been applied with signal success in the verification of oils and balsams, and as a ready means of indicating the changes which take place in those bodies by age or oxidation. The cohesion-figures of Tomlinson, from their great beauty and variety, combined with the exquisite harmony of coloring displayed by many of them, have been employed like those of the kaleidoscope of Brewster, to suggest forms for the pattern-designer.

In the production of cohesion-figures, water was the receiving surface generally employed by their discoverer; but in certain cases he also employed other fluids, such as mercury, acetic acid, cocoanut oil, and castor oil in the cold state; and spermaceti, white wax, lard, and sulphur in a state of fusion. On each of these substances, the liquid to be tested formed a different and characteristic figure, and hence additional means of comparison and verification were afforded.

2. *The Submersion-figures of Tomlinson.*—In the "Philosophical Magazine" for June 1864, this author brought forward a new series of cohesion-figures of liquids, in which the drop, being of great specific gravity, instead of forming a figure on the surface, sank beneath it, and formed a figure as it slowly made its way to the bottom of the vessel. In order to exhibit these phenomena, he employed a column of liquid in a cylindrical vessel. He states that a solution of cochineal dropped into water formed a figure typical of a large class of these figures. A drop laid on the surface sank down, opened into a ring, which became depressed at two opposite points; from these points, lines of fluid descended, which terminated in secondary rings; the secondary rings, in like manner, drooped down into lines carrying tertiary rings, and so on, until the lower part of the vessel became crowded with a complicated system of drooping rings and lines. Oil of lavender in a column of alcohol, fusel oil in paraffin oil, in benzole, in ether, &c., gave various and distinctive figures. He found that

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similar figures were obtained by the use of oils dropped into columns of hot spermaceti, lard, wax, &c.; and that these figures underwent considerable variation under the influence of change of temperature. We have already stated that each of these figures, whether surface-figures or submersion-figures, is characteristic of the fluid which forms it; and Tomlinson considers, with regard to the *surface-figure*, that it is a function of the cohesive force and diffusibility of the liquid, and the adhesion of the surface on which it is deposited: he also considered that it might be a function of the solubility and the diffusibility of the fluid in question, or of the solubility, the density, and the molecular attraction; while with regard to the *submersion-figure*, he thought each figure to be a function of the solubility, the density, and the molecular attraction.

8. *The Breath-cohesion Figures of Strethill Wright.*—These figures were discovered by Dr. Strethill Wright of Edinburgh, and communicated to the Royal Scottish Society of Arts on December 12, 1864. This author, who had long been engaged in observing phenomena connected with the modification of cohesive attraction produced between solids and fluids by heat and electricity, was induced to take up the subject afresh by the publications of Tomlinson, and one of the results was the production of his so-called "breath-cohesion figures." He employed as the recipient surface a freshly split, and therefore chemically clean, surface of mica; on this he placed a single drop of the fluid to be experimented on. He then breathed upon the surface, and instantly the drop flashed out into a figure characteristic of the fluid of which it was composed. By this means a variety of substances, such as vegetable extracts, tinctures and essential oils, and animal fluids such as serum, vaccine lymph, bile, mucus, and urine in its various pathological conditions, could be examined. By dusting the figures with hair powder or lycopodium, he was also enabled to render them permanent, and to exhibit them in his lectures, expanded to a diameter of fourteen feet by the oxyhydrogen microscope. In general appearance the breath-cohesion figures bear a strong resemblance to vegetable forms, especially to the fronds of the *Desmidieæ*. In many of them, as in the *Desmidieæ*, a very distinct bilateral symmetry is apparent. Others again simulate the forms of the larger *Algæ*. A great many are resplendent with the hues of the soap bubble, arranged in concentric bands and curves of excessive beauty; while others are veined throughout so as to resemble sections of agate. Dr. Wright considers that the breath-cohesion figure is the product of electric attractive force developed on the freshly split mica, as a well known consequence of cleavage.

4. *The Electric-cohesion Figures of Strethill Wright.*—These figures were described by Dr Wright to the Royal Scottish Society of Arts on April 11, 1864, and are produced by electrifying drops of various fluids placed on a clean plate of glass, vulcanite, mica, or other smooth non-conducting substance. By this method, an endless variety of beautiful dendritic figures are produced, differing not only with the fluid employed, but also with the slightest change in the character of the surface on which it is placed, and with the electricity, whether positive or negative, which is imparted to the drop. The electric-cohesion figures are produced in the following manner: A sheet of plate-glass is laid upon a plate of blackened metal, and in the centre of the glass a drop of the fluid to be operated on is deposited with a clean glass rod. The metal plate and the drop are then connected with the opposite poles of an induction coil (capable of giving a spark of about half an inch in length) in full action, and immediately branches protrude from the drop, which slowly creep over the glass until they closely cover a circle of four or five inches. Sulphuric acids, and solutions of potash, deliquescent salts, and organic fluids, give the best figures; while nitric and muriatic acids and distilled water do not form figures under the electric influence.

CO'HORT, in the ancient Roman armies, was a portion of a legion, consisting usually of 600 men. Generally, there were ten cohorts to a Legion (q. v.).

COHU'NE OIL, a fixed oil obtained from the kernel of the fruit of *Attalea Cohune*, a palm (see ATTALEA), abundant in Honduras and the Isthmus of Panama. The oil is said to be of the finest quality, and to burn twice as long as the best cocoa-nut oil. The tree attains a height of only about forty feet, but its leaves are thirty feet long, and each leaflet measures three feet. The sap is drawn off for palm-wine.

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COIF (Fr. *coiffe*, Ital. *cuffia*, a cap), a covering for the head in general, but more especially for the circular portion on the crown, which the Roman Catholic clergy are in the habit of shaving, and which is thence called the tonsure. The general meaning of the word is preserved in the verb to coif, coiffed, &c., and still more decidedly in the noun *coiffure*, which, so late as Addison's time, was English as well as French. Its special signification is now limited to the caul or cap worn by serjeants-at-law. It is now the only reminiscence of the tonsure amongst lawyers. On attaining the DEGREES OF THE C., or, what is the same thing, becoming a serjeant, a barrister retires from the Inn of Court by which he was called to the bar, and becomes a member of Serjeants' Inn. See SERJEANT-AT-LAW.

COIF, among the armor of the middle ages, was a sort of defensive hood, surmounted by a helmet, sometimes continuous with the hauberk, and sometimes separate.

COIMBATO'RE, a city in the province of Madras, capital of a district of the same name, situated near the left bank of the Noyel, a tributary of the Cauvery from the right, in lat. 11° n., long. 77° 1' e. It occupies the south declivity of the Neilgherries, 1438 feet above the sea, near the point where those otherwise isolated mountains connect themselves with the Western Ghauts. Almost immediately to the south of the junction of the two chains, the remarkable depression of Palghatcheri traverses the Western Ghauts from east to west, so as to afford a free passage for both the monsoons—the north-east and the south-west—in their respective seasons. C., which contains about 2000 houses, from its proximity to this great gorge, is admirably ventilated during most of the year. This peculiarity, backed by the elevation, tends to promote the salubrity of the place, which, however, is seriously impaired by the brackish character of the wells. In the neighborhood is a very large tank. Pop. (1871) 35,810. C. is on the line of railway from Madras to the west coast.

COIMBATORE, a district in the province of Madras, in lat. 10° 14'—12° 19' n., and long. 76° 56'—78° 16' e., containing 7432 square miles and (1871) 1,763,274 inhabitants. Lying to the north-east of the state of Cochin, it is almost entirely beyond the Western Ghauts. Besides the capital above described, there are in the district the towns of Palaghat and Darrampoor.

COI'MBRA, a city of Portugal, capital of the province of Beira, situated on the right bank of the river Mondego, here crossed by a stone bridge, 110 miles north-north-east of Lisbon. Built round a conical hill, rising abruptly from the river, and surrounded by olive-gardens and orange-groves, its appearance from a distance is as beautiful as it is picturesque. Interiorly, however, it is not so attractive, its streets being steep, narrow, and dirty. Great historical interest attaches to C., which appears to have been originally built by the Goths. From them it passed to the Moors, from whom it was finally conquered in 1064, by Fernando the Great, aided by the gallant Cid. On the erection of Portugal into a kingdom, in 1139, C. was made the capital, and continued so about two centuries and a half. Of the public buildings, the most noteworthy are the cathedral, the churches of San Francisco and San Salvador, the convents of Santa Cruz and Santa Clara, and a fine aqueduct of 21 arches, dating from the 16th century. The university of C., the only one in Portugal, was originally established in 1290, but permanently transferred here in 1537. It has 46 chairs, and about 1000 students, many of the latter being Brazilians. Attached to the university are museums, an observatory, a botanical garden, and a library of 60,000 volumes. C. has manufactures of linen, woollen, earthenware, and combs. Pop. 13,200.

COI'N, a town of Andalusia, Spain, about 21 miles west of Malaga. It is pleasantly situated on a declivity, with wide clean streets, and environed with fine public walks and gardens. It has manufactures of linen and woollen, soap, paper, &c., and in the vicinity, marble and jasper are obtained. Pop. 8200.

COIN, Coining. See MINT, NUMISMATICS, MONEY, CURRENCY.

COI'NCIDENCE. If, when two geometrical figures are laid upon one another, the boundaries of the one fall everywhere exactly upon those of the other, the figures are said to *coincide*. Such figures are considered as identical; and this C. is

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taken by Euclid as the test of equality, or rather, as the definition of equality. It is not necessary, in geometry, actually to lay the one figure upon the other; if we know the equality of certain parts, we can infer with certainty that the whole figures *would* coincide, if superimposed, and that the other parts are therefore equal too.

COINING, in Law. The privilege of C. money being an exclusive prerogative of the crown, the crime of counterfeiting the king's money, as it was called, was declared to be treason, both by the common law of England and by many statutes. In Scotland, there continued to be some differences in regard to this crime, even after the Union had extended the treason laws of England to that kingdom.

The whole of the legislation on this subject was at length repealed, and a general act passed for the whole kingdom (2 Will. IV. c. 34). By this statute it is enacted—1. That any one who shall fabricate a coin in imitation of a current *gold* or *silver* coin—or gild silver, or color any counterfeit gold or silver coin—or shall alter silver coin with intent to make it pass for gold coin—or copper coin, to make it pass for gold or silver coin, shall be punishable with transportation for life, or for a term not less than seven years, or with imprisonment for a term not exceeding four years. 2. That any one who shall impair, diminish, or lighten gold or silver coin, shall be punishable with transportation for seven years, or imprisonment for three years. 3. That any one who shall buy, sell, receive, pay, or put off counterfeit gold or silver coin for a lower value than its denomination, or shall import counterfeit gold or silver coin, knowing it to be such, shall be punishable with transportation for life, or seven years, or with imprisonment for not more than four years. 4. The uttering (q. v.) of base coin is punishable with imprisonment for a year. 5. By subsequent clauses, the possession of false money, with intent to utter the same; or of instruments for its fabrication; the conveying such instruments out of the Mint without authority; the fabrication of copper coin, and the altering of current coin so as to make it pass for coin of a higher denomination, are declared to be offences all of which are visited with punishments resembling those above mentioned.

In order to bring these offences within the limits of the statute, it is not necessary that the resemblance of the false to the true coin shall be very perfect; but if it be not such as to deceive a person of ordinary observation, the attempt to bring it into circulation is fraud, and not uttering.

COIR, or Co'coa-nut Fi'bre, the fibre of the husk of the cocoa-nut, much used for making ropes, mats, &c. The husks are steeped in water in pits, for six months, or even for a year, and then beaten with a stick till the fibre readily separates. C. is now well known as one of the best materials for cables, on account of its lightness, elasticity, and strength. C. ropes are produced in great quantity in the Laccadive Islands. They are entirely made by the hand—chiefly by women—without the aid of machinery of any kind. The manufacture of cocoa-nut mats is now carried on to a considerable extent in Britain, the husks being imported for that purpose. This manufacture is one of the branches of industry in which children are employed in the industrial or ragged schools, and criminals in prisons.

COIX. See JOB'S TEARS.

COJUTEPE'C, a town of San Salvador, Central America. It is situated 15 miles to the east of the city of San Salvador, destroyed by earthquake in 1854, and was the seat of government from that year until 1858. C. has a population of 15,090.—At the distance of a few leagues, a lake of the same name measures 12 miles in length by 5 miles in average breadth; and in windy weather it assumes a green hue, often casting on its shores vast quantities of dead fish.

COKE is the fuel generally used in locomotive engines, and is obtained by the heating of coal in ovens, or other arrangements where little air is admitted. Caking coal is most suitable for the manufacture of coke. The process is conducted either (1) in heaps or ridges, or (2) in ovens. The coking in heaps is called the Meiler method, and consists in placing the coal in round stacks, or in long ridges, occasionally to the length of 200 feet. During the building of the coal, wooden stakes are driven in, which are afterwards taken out, and lighted coal introduced at numerous places at the same time. As the coal becomes heated, much smoke and vapor are evolved, which mainly consist of tar, water, and coal-gas. Whenever the

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smoke ceases to be evolved, the process of coking is regarded as concluded, and the mound or ridge of red-hot cinder, or C., is covered over with fine coal-dust, which, excluding the air, extinguishes the combustion. At places where the operation of coking is conducted regularly on the large scale, it is customary to erect brick chimneys or columns, about the height of the proposed mound, and to build the coal round these, placing the larger masses in the centre, the smaller pieces outside, and ultimately covering the whole with fine coal or dross.

A more economical plan of preparing C. is to introduce the coal into fire-brick ovens. The coal is introduced by the top, and being lighted, a little air is admitted by openings in front. Whenever the coal ceases to evolve smoky vapor, every opening is closed, and the oven is allowed to cool down for 12 to 24 hours. A door in front is then opened, and the C. being raked out whilst still hot, water is thrown upon it, to stop the combustion. Small coal may be used if it belongs to the caking kind; and a little water sprinkled over it, causes the caking operation to proceed more completely. The proportion of C. obtained from coal in Great Britain ranges from 54 to 78 per cent., so that in round numbers the better class of coal for this purpose loses a fourth of its weight. At the same time, the coal increases in volume to the extent of about one-fourth.

C. is a hard, brittle, porous solid, with a color varying from iron-gray to blackish-gray, and more or less of a metallic lustre, and does not soil the fingers. It absorbs moisture from the air, sometimes to the extent of 30 per cent., and contains an amount of ash ranging from ½ up to 15 per cent. It gives off no smoke in burning, is of great value as a fuel, evolving a very large amount of heat, and is used, not only in locomotive and other furnaces, but also in the smelting of metallic ores.

COKE, Sir Edward, a distinguished English lawyer and judge, was born at Mileham, in Norfolk, on the 1st of February 1551—1552. Educated at the free grammar-school of Norwich, and at Trinity College, Cambridge, he passed thence to Clifford's Inn, and subsequently to the Inner Temple, to study law, and was called to the bar in April 1578. His great ability, legal learning, and the tact he exhibited in the conduct of his cases, secured him an immense practice on the very threshold of his career. In 1586 he was appointed recorder of Norwich; in 1592, recorder of London, a position he resigned the same year for the solicitor-generalship. In the following year, he was elected member of parliament for the county of Norfolk, and was chosen Speaker of the House of Commons. In 1594, he was made attorney-general, an office he continued to hold until 1603, when he was appointed Chief-justice of the Common Pleas, the duties of which position he discharged in a manner that secured for him a great reputation. Upright and independent, with a high notion of the dignity and importance of his office, he did not, in an age of judicial sycophancy, hesitate to oppose any illegal encroachment by royalty. The court thought to win him over by making him, in 1613, Chief-justice of the King's Bench. But here he proved equally incorrigible, maintaining, among other things, that the king had no power to stay the proceedings in a court of justice, even when his craven-hearted colleagues begged the royal pedant's pardon on their knees for ever having entertained such an opinion. This was too much: C., in a few months (Nov. 1616), was relieved from his chief-justiceship; but in no long time after, the royal favor was in some measure again extended to him. His support of liberal measures in parliament, however, soon brought him into trouble with the court-party, and in 1621—1622, he suffered seven months' imprisonment in the Tower. In the third parliament of Charles I. (1628), C. took an active part in framing the celebrated Bill of Rights, and it was in a great measure owing to his advocacy that the Lords were induced to agree to it. C. died 3d September 1633. He is now best known for his law treatise, "Coke upon Littleton, or the First Institute," a work which is still the standard one on all questions of constitutional and municipal law in England. His other works are the "Second," "Third," and "Fourth Institutes," "The Complete Copyholder," and "Reading on Fines;" while his collection of law reports, which made an epoch in the history of law on their appearance, are still of great value for the profession.

COL (Fr. *neck*), in Geography, is a depression or pass in a mountain-range. In those parts of the Alps where the French language prevails, the passes are usually named cols—as the Col de Balme, the Col du Géant, &c.

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COL' A'RCO, in Music, with the bow, in contradistinction to *pizzicato*.

CO'LA NUT, or Kola Nut, the seed—not properly a nut—of *Cola acuminata* or *Sterculia acuminata*, a tree of the natural order *Sterculiaceæ*, a native of the tropical parts of the western coast of Africa, and cultivated in other tropical countries. There are two varieties of the tree—one with broad, and the other with narrow leaves. The natives of Guinea value the seeds very highly, believing that to take a portion of one of them before their meals, improves the flavor of whatever they may eat or drink. When sucked or chewed, cola nuts are generally asserted to render the flavor even of very putrid water agreeable; but see foot-note under TEA. They are said to possess properties analogous to Peruvian bark. They are of the size of a pigeon's egg, of a brownish color, and bitter taste. They are mentioned by almost all travellers in W. Africa.

CO'LBERG, or Kolberg, a fortified seaport of Prussia, in the province of Pomerania, on the Persante, near its mouth in the Baltic, in lat. 54° 9′ n., long. 15° 34′ e. It stands on a hill, surrounded with swamps, which can be readily laid under water, and is chiefly remarkable for the protracted sieges which it has undergone. In 1102, Duke Boleslaus of Poland besieged it in vain. It endured long sieges in the Thirty Years' War, and in the Seven Years' War, and again in 1807, when it was most gallantly defended against the French. C. has manufactures of woollen, salt, and spirits; and salmon and lamprey fisheries. Pop. (1871) 18,180.

COLBERT, Jean Baptiste, minister of finance to Louis XIV., was born at Rheims in 1619, and served his apprenticeship in a woollen-draper's shop. He afterwards went to Paris, where his talents introduced him to Mazarin, who soon employed him in most important affairs of state. On his death-bed, Mazarin warmly recommended C. to the king, who, in 1661, appointed him controller-general of finances. C., who found the finances in a ruinous condition, immediately began his reforms. Fouquet, the superintendent under Mazarin, was found guilty of impoverishing the state by his maladministration, and imprisoned for life. C. next instituted a council of finance and a chamber of justice, to call to account the farmers of the state-revenues, who were forced to yield up all the resources of the crown of which they had fraudulently possessed themselves. The debts of the state C. also reduced by arbitrary composition. So complete and thorough was the change which C. effected, that in twenty years the annual revenue had risen to 116 million livres, of which 23 were spent in collection and administration; whereas, when the management of the finances was intrusted to him, the revenue amounted only to 84 million livres, and 52 millions were absorbed in its collection. C. did not rest satisfied with being a monetary reformer, but in various ways developed the industrial activity of the nation by state support. Commerce was extended, roads and canals—including that of Languedoc—were made. He organised anew the colonies in Canada, Martinique, and St Domingo, and founded others at Cayenne and Madagascar. Made minister of marine in 1669, he found France with a few old rotten ships; three years later, she had a fleet of 60 ships of the line, and 40 frigates. C. improved the civil code, introduced a marine code of laws, as well as the so-called *Code Noir* for the colonies; and statistical tables of the population were first made out by his orders. While attending to material interests, he did not neglect the arts and sciences; all men of learning and genius found in C. a generous patron. The Academies of Inscriptions, Science, and Architecture were founded by him. In short, C. was the patron of industry, commerce, art, science, and literature—the founder of a new epoch in France. Notwithstanding the ingenuity of C., the unbounded extravagance of his master led him to raise money in ways objectionable to his reason, and to maintain war-taxes in time of peace. He died 6th September 1683, bitterly disappointed, because his great services were but ill appreciated by the king. The people, enraged at the oppressive taxes, would have torn C.'s dead body in pieces, but for the intervention of the military, and his burial by night. Because he had brains without birth, he was vexed and persecuted, both in private and public life, by those who, having birth, lacked brains.

CO'LCHESTER, a parliamentary and municipal burgh and river port, in the north-east of Essex, on the south bank of the Colne, 12 miles from the sea, and 51 miles north-east of London. It stands on the sides and top of an eminence, and is well built. It has a quay for vessels of 150 tons at the suburb called Hythe. Its

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former manufactures of baize and silk have both declined. The important oyster fishery has suffered of late. Pop. (1871) 26,343. C. returns two members to parliament. In 1875, 843 vessels of 45,600 tons entered, and 518 of 22,451 cleared the port. C. is the British *Camulodunum* and the Roman *Colonia*. The town-walls, castle, and many churches and other buildings, consist of Roman brick. Great quantities of Roman remains have been found here, bushels of coins of many emperors, vases, urns, lamps, rings, bracelets, pavements, paterae. C. was ravaged by the plague in 1348, 1360, and 1665. The ruins of the castle, built of cement-stone and Roman brick soon after the Conquest, have walls 11 to 30 feet thick. There are the ruins of an abbey, founded by Eudo the "Dapifer," and the remains of a priory.

COLCHESTER, Charles Abbot, Lord, a distinguished legal and administrative reformer, was born at Abingdon, Berkshire, October 1757. He was educated at Westminster School, and Christ's Church College, Oxford, and afterwards studied for the bar. Returned to parliament in 1795, he in the very next year succeeded in effecting an improvement in the legislation regarding temporary and expiring laws; and it is due to his exertions that municipal bodies receive a copy of all new acts as soon as they are printed. The country is mainly indebted to him for the royal record commission, the proceedings of which he for many years superintended. But the greatest service he rendered the country was in obtaining an act for taking the census of the population, the first enumeration under public authority in modern times. It was on his suggestion, too, that the Private Bill Office, which has done much to facilitate parliamentary business, was established. In 1802, he was elected Speaker of the House of Commons, the duties of which high and honorable office he continued to discharge with as much impartiality as distinction, until May 1817, when ill health compelled him to resign. He was then elevated to the peerage as Baron Colchester, with a pension of £4000 a year. He died May 29, 1829.

COLCHICUM, a genus of plants of the natural order *Melanthaceæ*. The species, which are few in number, are stemless, with flowers half subterranean like the crocus, the limb of the perianth and part of the tube only rising above ground. The flowers much resemble crocus-flowers, but are readily distinguished by having six instead of three stamens, and three styles instead of one. The seed-vessel does not remain to ripen underground, as in the crocus, but after the flowering is over, rises in the form of three little follicles slightly adhering to each other, on a lengthened stalk. The only British species is *C. autumnale*, the MEADOW SAFFRON, sometimes also, but incorrectly named *Autumn crocus*, which is plentiful in meadows and pastures in some parts of England, and of the continent of Europe. It scarcely occurs as a native plant in Scotland. The flowers are pale purple; they appear in autumn, unaccompanied by any leaves; the leaves, which are large and broadly lanceolate, appear in spring, when the stalk which bears the ripening fruit arises amongst them. The whole plant is very acrid and poisonous, chiefly owing to the presence of an alkaloid called *Colchicine* or *Colchicia*. Cattle are not unfrequently injured by it in pastures where it abounds. It is, however, not difficult to extirpate, the repeated pulling of it by the hand, as it appears above ground, being sufficient for this purpose; the roots soon become exhausted, and die. It is a valuable medicinal plant, and is much administered, in small doses, to allay the pain of gout and rheumatism. Repeated doses produce vomiting, purging, increase of the urinary secretion, and profuse perspiration. C. is generally supposed to have been the basis of the *Eau medicinale*, long a celebrated empiric remedy for gout. The parts chiefly used for medicinal purposes are the corn (popularly called the root) and the seeds. The seeds are round, brown, rather larger than mustard-seed; and fatal accidents have occured from their poisonous nature.—Other species of C. appear to possess similar properties. The *hermodactyls* of the druggists' shops, which for many centuries have enjoyed an extensive celebrity for soothing pains in the joints, and are brought from the Levant, are believed to be the corms either of *C. variegatum* or *C. bulbocodioides;* the former of which is probably the C. of the ancients.—*C. autumnale* is not unfrequent in flower-borders, particularly a variety with double flowers.

COLCHIS, a province of ancient Asia, on the east coast of the Pontus Euxinus or Black Sea, situated north of Armenia, and south of the Caucasus. It now forms

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the Russian province of Imerethia, with the districts of Mingrelia and Guria. It was celebrated in the very earliest times as the native country of Medea (q. v.), and the goal of the Argonauts (q. v.), and was afterwards better known to the Greeks as the seat of some colonies of the Milesians. It was noted for its wine and fruits. The Colchians, according to Heredotus, were of Egyptian descent, being relics of the army of Sesostris, which he attempts to prove by various arguments. In the time of this historian they were subject to Persia; subsequently, they threw off their allegiance, and were ruled by kings of their own; the country then came under the dominion of Mithridates, king of Pontus; afterwards, there were princes of Colchis dependent on the Romans. The principal town was Dioscurias (called under the Romans Sebastopolis), and now Isgaur; the principal river the Phasis.

COLD is the term by which we signify a relative want of sensible heat. There are, therefore, no determinate boundaries between cold and heat, and it is a mere arbitrary distinction to call the degrees of the thermometer below the freezing-point degrees of cold. When the atmosphere, or any substance which comes in contact with our body, contains less heat than the body, it absorbs heat from the body, and we call it cold. See HEAT.

The physiological action of C. on the animal organism requires a brief notice. All animals (the warm-blooded animals to the greatest extent) have a certain power of maintaining the heat of the body, in defiance of external cold, as has been shewn in the article ANIMAL HEAT. This power is mainly due to a process analogous to combustion, in which carbon and hydrogen taken into the system in food, are made to unite with oxygen derived from the air by respiration. If the combustible materials are not duly furnished, or if the supply of oxygen be deficient (as in various diseased conditions), there must be a depression of temperature. Now, if the temperature of a bird or mammal (except in the case of hybernating animals) be lowered about 30° below its normal standard (which in birds ranges from 108° to 112°, and in mammals from 98° to 102°), the death of the animal is the result. The symptoms indicating that an animal or a man is suffering from a depression of the temperature of the body, are, retardation of the circulation of the blood, causing lividity of the skin, which is followed by pallor, in consequence of the blood being almost entirely driven from the surface, through the contraction of the vessels; a peculiar torpor of the muscular and nervous systems at the same time manifests itself in an indisposition to make any effort or exertion, and in intense sleepiness. The respiratory movements become slower, for physiological reasons, which will be explained in the article RESPIRATION, and the loss of heat goes on, therefore with increasing rapidity, till the final limit is reached, and death supervenes.

In hybernating animals (the marmot, dormouse, bat, &c.), the power of generating heat within their own bodies is very slight, their temperature following that of the external air, so that it may be brought down nearly to the freezing-point. At this low temperature, the vital actions are scarcely perceptible, but when the temperature is again raised, the vital activity returns. The respirations (in marmots) fall from 500 to 14 in the hour, and are performed without any apparent movement of the walls of the chest; the pulse sinks from 150 to 15 beats in the minute; and the animals can with difficulty be aroused from their torpor.—For additional matter bearing upon this subject, see the articles HIBERNATION, STARVATION, and DORMANT VITALITY.

C. is one of the most powerful depressing agents, and is a fruitful cause of disease and even of death. Thus it is observed that whenever the temperature of the atmosphere is suddenly reduced, and particularly when it is reduced below the freezing point, a considerable addition takes place to the mortality of the country at large. The effects of C. are, in ordinary circumstances, most apparent among the aged and the very young, and among those suffering from chronic diseases; but when a very low temperature is long continued even the healthy are sure to suffer, when impoverished so as not to have sufficient means of external warmth in their homes. The most direct effects of C. are in the production of what is commonly called frost bite. The part so affected is deprived of circulation, and does not bleed on being wounded; it is marble white or livid, and has lost all sensibility; and if the exposure is continued, or reaction is brought about too rapidly, it is apt to pass into gangrene. The extremities, especially the fingers and toes, and the tip of the

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nose, are the parts most liable to frost bite. The remedy is exceedingly gradual restoration of the temperature, with gentle friction. In Russia friction with snow is commonly resorted to, so as to secure against too rapid reaction. The effects of C. upon the general system are described by arctic voyagers, and a medical detail of them may be found in Baron Larrey's interesting account of Napoleon's disastrous campaign in Russia. The circulation is much depressed; diarrhœa and rheumatic pains are frequent; in the end, the general sensibility becomes impaired, and an irresistible tendency to lie down is experienced, with excessive drowsiness. If this be not resisted, death is certain. The disease commonly termed "a cold" has been already described under CATARRH.

COLD CREAM is the term applied to a preparation of fatty substances, which is used as a mild and cooling dressing for the skin. It may be prepared by heating gently four parts of olive-oil, and one part of white wax, till a uniform liquid mass is obtained, when a little color and scent may be added; the mixture is then allowed to cool, but must be stirred the whole time, so as to prevent the concretion and consequent separation of the wax. Another variety is prepared with the addition of hogs' lard, but the latter sometimes contains common salt, and is liable to become more or less rancid. C. C. softens the skin, and tends to promote the healing of wounds and of chapped hands.

COLD PIT, or Cold Frame, in Gardening, is a simple contrivance for the preservation of half-hardy plants throughout winter, and consists of a pit, seldom more than three feet in depth, and often not so much, walled or unwalled, and covered with a frame, either thatched or glazed.

CO'LDSTREAM, a border town in the south of Berwickshire, on the left bank of the Tweed, 15 miles south-west of Berwick, and on one of the main routes from Scotland to England. It is irregularly built on a high site. Pop. (1871) 1724. Near C. is the famous ford of the Tweed, where the Scotch and English crossed in former times, before the erection of Berwick Bridge. By this ford Edward I. entered Scotland in 1296, and near it he met the Scottish nobles, to settle the dispute of Bruce and Baliol about the crown of Scotland. By this ford also the Scottish army entered England in 1640. Here General Monk, 1659—1660, raised the regiment still known as the Coldstream Guards (q. v.). Being a border town, C., like Gretna Green, was formerly celebrated for its clandestine marriages.

CO'LDSTREAM GUARDS, a regiment in the Foot Guards (q. v.) or Household Brigade, is the oldest corps in the British army except the 1st Foot. General Monk, in 1660, raised a corps at Coldstream, which was at first called "Monk's Regiment;" but when parliament consented to give a brigade of guards to Charles II., this corps, under the name of C. G., was included in it.

CO'LEBROOKE, Henry Thomas, an eminent Orientalist, was born in 1765. He early went out to India, where, having served in various civil capacities under the East India Company, he was appointed Sanscrit professor in the newly founded college at Fort-William. Afterwards he became a judge at Mirzapore, and subsequently held the appointment of President of the Board of Revenue. During his residence in India, he had gained an extensive knowledge of the literature of the Vedas and their commentators, as well as of the writings of ancient Hindu grammarians, metaphysicians, and mathematicians. A sound critical judgment marks all his writings. He was a director of the Bengal Asiatic Society; and many of the most valuable essays in the "Asiatic Researches" were contributed by him. These, with other papers, were afterwards republished as "Miscellaneous Essays," in 2 vols., 1837. He also made translations from the Sanscrit works on Hindu law, algebra, arithmetic, and mensuration, which were important contributions to the history of mathematics. Among his other publications, were a dictionary and a grammar of the Sanscrit language, and treatises on the philosophy and on the sacred Books of the Hindus. He died in London (where he had for some years been president of the Asiatic Society), March 10, 1837.

COLEO'PTERA, or Coleo'pterous Insects (Gr. *koleos*, a sheath; and *pteron*, a wing), an order of insects which, with a little change of limits and characters, has been recognised since the days of Aristotle. The number of species enumerated by naturalists, and of which examples are gathered in museums, amounts to many

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thousands. The C. are sometimes collectively called *beetles*, although that name is generally more limited in its application, and many of them are known by other names, as weevils, lady-bugs, &c. The glowworm and the blistering-fly (*cantharis*) belong to this order.

The C. may be described as four-winged insects, which have the first pair of wings converted into crustaceous wing cases (*elytra*), and the second pair of wings folded crosswise, under these when not in use. In some of them, the membranaceous wings are wanting, or rudimentary, in one or in both sexes, for there is often a difference of the sexes in this respect: more rarely, the elytra also are wanting in one sex, as in the female glowworm. The head and antennæ vary extremely in different C., the antennæ often differ considerably in the male and female of the same species. The first segment of the thorax (*prothorax*) is greatly larger than the other two. The abdomen is united to the thorax by its whole width, and not by a stalk. C. have two composite eyes, and no additional simple or stemmatic eyes (*ocelli*). The mouth is fitted for cutting, gnawing, tearing, or chewing, but never at all for suction, and exhibits in the greatest perfection of development the complicated structure which belongs to the mouth of all the *masticating* or *mandibulated* insects. See INSECTS. The upper jaws or *mandibles* are hard and horny in most of the C., but comparatively soft in those which feed on vegetable juices, or on putrescent animal matter. The food of the C. is very various: some prey on other insects, worms, &c.; some feed on carrion; some on rotten wood—some on wood in a fresh and growing state—some on the roots of grasses and other plants—some on grain—some on leaves—some on flowers, &c. The food of their larvæ is equally various; but perfect insects and larvæ generally agree in being very voracious. Their digestive organs exhibit great diversities, according to the kinds of their food. The C. are among the insects which undergo complete transformations, and of which the pupa is inactive. The larva (grub) is generally like a short thick worm, with a scaly head and mouth, generally with six legs, of which, however, some species are destitute. Coleopterous insects are distributed over all parts of the world, but are most abundant within the tropics, where also they attain their greatest size and greatest brilliancy of colors. The splendor of the metallic tints exhibited by many of the tropical species is not excelled in nature. The order, however, contains also many species of dull hue, and sufficiently unattractive appearance. Many of the C. are noted for the mischief which they do to crops, stores of provisions, timber and articles of furniture, trees, &c.; few of them are of any immediate use to man, the principal of these being the blistering-flies or cantharides.

COLERAINE, a parliamentary and municipal borough and seaport, in the county of Londonderry, Ireland. It is situated chiefly on the right bank of the Bann, four miles from the sea, and 47 miles north-north-west of Belfast, with which it is connected by railway. It consists of a central square and several diverging streets. C. has manufactures of fine linens, leather, paper, and soap, and a large salmon and eel fishery, which produces a rent of nearly £5000. The river Bann has recently been deepened, so that since 1878 larger vessels reach the quay at C. In 1875, 437 vessels, of 51,000 tons burden, entered the port, and 279, of 38,720 tons, cleared. The revenue of the borough was in 1875, £2463; its debt, £18,109. The population, in 1871, was 6082, of whom 1829 were Roman Catholics, 2090 Protestant Episcopalians and 2124 Presbyterians. C. returns one member to parliament.

COLERIDGE, Samuel Taylor, was born at Ottery St Mary, in the county of Devon, of which parish his father was vicar, on the 21st October 1772. He was educated at Christ's Hospital, and numbered Charles Lamb among his school-fellows. His acquirements in Greek were extensive; and before his 15th year he plunged boldly into the sea of metaphysics, and swam therein until the day of his death. His industry, if desultory, was great; he read whole libraries. Full of book-knowledge, and without ambition or any practical bent, he was on the point of apprenticing himself to a shoemaker, when his head-master interfered, and rescued to literature and thought his most distinguished scholar. A copy of Mr. Bowles's sonnets falling into his hands at this time, attracted him towards poetry, in which for a time he found rest.

In 1791, C. entered Jesus College, Cambridge. At the university, he displayed no mathematical aptitude; his whole mind was given to classics, and he obtained

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a prize for a Greek ode. He did not take a degree. During the second year of his residence at the university, in a fit of despondency, occasioned by an unsuccessful love matter, he quitted Cambridge for London, and enlisted in the 15th Dragoons, under the assumed name of Comberbach. He never advanced beyond the awkward squad, and he enjoyed to the close the reputation of being the worst rider in the corps. One of the officers luckily discovered his classical acquirements, and, becoming acquainted with his real history, communicated with his friends, and C. effected his discharge.

On his release, the poet proceeded to Bristol, and making the acquaintance of certain poetic enthusiasts—Southey was of the number—whose minds were somewhat unsettled by the revolutionary movement in France, he formed a scheme to emigrate to the banks of the Susquehanna, in North America, and there, in pastoral peace and plenty, to bring back the golden age to man. C. found, to his surprise, that before Paradise could be thus regained, money was indispensable; and as of *that* both he and his friends were absolutely devoid, the dream of "Pantisocracy" had to be given up. About this time, Joseph Cottle, bookseller in Bristol, paid C. thirty guineas for a volume of poems, and after many delays and the advancement of additional sums, the volume was published. In 1795, he married Miss Fricker—his friend Southey on the same day wedding another sister—and removed to Nether Stowey, a village in Somersetshire, in which neighborhood Wordsworth was then staying. It was here, surrounded with beautiful scenery, and in daily communication with the graver and intenser spirit of his friend, that C.'s principal poems were composed. Here he wrote the "Ancient Mariner" and the first part of "Christabel," the music of which took captive Scott and Byron, and which was imitated by both with no remarkable success. At this time C. was in theology a Unitarian, and preached frequently to congregations of that religious sect. In 1798, he visited Germany, and studied at Göttingen. On his return to England, he went to reside at the Lakes, where Wordsworth and Southey then lived; and then it was that the nickname "Lake poets" was applied by the opposition Reviews to the trio of friends—a nickname which has long since ceased to be a reproach. In the year in which C. went to live in Cumberland, he published his noble translation of Schiller's "Wallenstein." Having formed a connection with the "Morning Post," he contributed to its columns articles on politics and literature. In 1804, he was at Malta, acting as secretary to the governor, Sir Alexander Ball, an appointment he held nearly a year and a half. In 1808, he delivered lectures on Poetry and the Fine Arts at the Royal Institution, London; and the year after, he commenced the publication of "The Friend," a serial which did not find much commercial success. By this time, C. had written, if he had not published, his finest poems; and imprudent, without resolution, or strong sense of duty, and with a taste for German metaphysics and opium gradually taking possession of him, he left his wife and family with Southey, and went to London, where he resided first with Mr. Basil Montague, and afterwards, and up till the period of his death, with Mr. Gillman at Highgate. Here the rays of his splendid genius shone more and more fitfully through clouds of German metaphysics, and his mental and moral fibre became more and more debilitated by opium. He meditated many theological and philosophical works, which were to "reduce all knowledge into harmony," and many epic poems which were to be the glory of literature, and never progressed so far as the first sentence of either. With the subsidence of the writing faculty, the talking faculty developed itself in C. after a fashion unknown to ancient or modern times. At Mr. Gillman's house, he held weekly *conversazioni*, discoursing on every subject human and divine for hours; and thither, from all parts of the country, ardent young men came rushing to listen to the wisdom of the sage, in "linked sweetness" exceedingly "long drawn out." Towards the close of his life, his religious opinions underwent a change, and he became a believer in the Trinity. All intellectual pride had ceased, and the most childlike humility had taken its place. He seemed to be conscious that the greatest powers which for generations had been granted to any Englishman had been by him miserably wasted. He died at Highgate on the 25th July 1834, in his 62d year.

As an intellectual power, C. manifested himself in a great variety of ways. Compared with his contemporaries, he did not produce a very large amount of original poetry; and of what he did produce, a considerable portion is prosaic and artificial,

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but the residue is of the highest order of merit. No poet ever evolved such exquisite fantasies, or wove our language into such webs of spiritual melody. He is also to this day the greatest of philosophical critics. He was the first who gave a definite reason for the "faith that is in us" regarding Shakspeare. He was the first representative of German literature and philosophy in England, and, till Carlyle came, the most potent. His own philosophical and theological writings, although, from constitutional indolence and irresolution, in some measure incomplete, are full of incidental merits, and have given a new impulse to English thought; yet it is right to mention here, that in his philosophical writings he has been convicted of the most extraordinary plagiarism. Professor Ferrier, in "Blackwood's Magazine," April 1840, "tracked the footsteps of this literary reaver through the Hercynian brakes" of Schelling's metaphysics (see also Hamilton's Reid, note), and has shewn page after page to be pilfered from the German author. It has been argued, however, by way of explanation and palliation, that C., who certainly did not lack original and penetrating powers as a metaphysician, was, from the sluggishness and irresolution of his mind, better fitted to conceive in outline, and then adapt from others in detail, than to elaborate for himself a system of thought, or even the fragment of a system; while his notoriously confused and dreamy memory would be apt to mingle and confound what was his own with what *might have been* such. As a thinker, C. exerted greater influence through conversation than through printed books; and to him we are largely indebted for what of excellence the young men who listened to him at Highgate, the Sterlings, the Hares, the Maurices, and many others have since produced.

COLERIDGE, Hartley, the eldest son of Samuel Taylor Coleridge, was born at Clevedon, near Bristol, on the 19th September 1796. In 1815, C. was entered a scholar at Merton College, Oxford. At the university, he became the slave of intemperate habits, and after obtaining the Oriel Fellowship in 1818, he was judged to have forfeited it by the authorities. He then went to London, wrote for the "London Magazine," and published therein some sonnets of remarkable beauty. He afterwards repaired to Ambleside, to receive pupils, but the scheme failed. Near this little town, so associated with genius, he resided till his death in 1849. He inherited much of his father's genius, and all his weakness of will. He wrote good verses and better prose. As a writer of verse, he is best known by his sonnets, some of which are surpassed only by those of Milton and Wordsworth. His most important prose works are the "Worthies of Yorkshire and Lancashire," and the "Life of Massinger."

COLEROO'N, the largest and most northerly branch from the Cauvery, flows, after a course of 93 miles, into the Bay of Bengal between Trichinopoly on the north and Tanjore on the south, separating these two districts throughout its last 80 miles. This river is remarkable for two specimens of what is called an *anakatt*, being something of the nature of a weir or dam. For many years, the bed of the C. had been observed to be gradually deepening, while that of the Cauvery, below the point of divergence, was proportionately rising, so as constantly to lessen the supplies for the irrigation of Tanjore. In 1836, however, two anakatts, an upper and a lower, were constructed, to prevent the C. from being further deepened, and to throw more water into the Cauvery—works which were soon found to act so powerfully as to require the balance of an anakatt across the Cauvery itself.

CO'LESEED. See RAPE.

CO'LEWORT, a name given to some of the many cultivated varieties of *Brassica oleracea* (see BRASSICA), and applied, like the names Borecole and Kale, to varieties differing from the CABBAGE (q. v.) in their open heads of leaves, which are used as greens, especially in the winter-months. The same name is also given to cabbages cut for use before their leaves have fully closed into heads; and the common kinds of cabbage are often planted pretty closely together, in order to be used in this way, for a supply of greens in winter and spring. C., or *collet*, is said to have been originally a name of the wild plant"from which all the cultivated varieties are derived.

COLIBRI. See HUMMING-BIRD.

CO'LIC (from *colon*—see ALIMENTARY CANAL), a name employed by the later Greek and the Roman physicians to denote diseases attended with severe pain and

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flatulent distension of the abdomen, without diarrhœa or looseness of the bowels. The disease (commonly called *gripes* or *belly-ache*) is now generally believed to be spasmodic in character, and to be dependent upon irregular contractions of the muscular coat of the intestines: its supposed particular connection with the colon, or large intestine, however, is not usually to be made out from the symptoms. Painful disorders of the bowels are very frequent in persons who are not attentive to the regular evacuations, especially when they are exposed to cold so as to experience chill or coldness of the feet, which will often suffice to bring on an attack of colic. The disease is usually attended with constipation (q. v.), and ceases when the regular action of the bowels is restored, although often in this case the operation of medicine is attended by continued pain for a time. Warm fomentations to the abdomen may be employed with advantage, sometimes medicated with opium, or decoction of poppy-heads; and great relief is commonly experienced from friction with a warm liniment, such as opodeldoc, or the soap and opium liniment. Warmth to the feet, and the recumbent posture, are also to be recommended. In very severe or protracted cases, opium may be taken internally. A good remedy in such cases is a full dose of castor-oil (one ounce or more for an adult), with 30 or 35 drops of laudanum, or of solution of morphia. (Opiates should not be given to children except under medical advice, and in very reduced doses.) When C. resists such mild and simple remedies as the above—when it is accompanied by tenderness of the belly, or by hard swelling in any part of it—when constipation is obstinate, or vomiting is present—when there is feverishness, or tendency to exhaustion—or when there is reason to believe that it may depend on any other cause than the mere accumulation of the products of digestion in the intestines, no time should be lost in seeking the best medical assistance that can be procured; for C. is closely allied as a symptom to several very severe and dangerous diseases. One of these complicated forms of C. is termed Ileus (Gr. *eileon*, from the idea that its seat was in the small intestine (*ileum*). It is attended with obstruction of the bowels, often from mechanical twisting or involution of one part with another (hence termed *volvulus*). This is, of course, a disease of extreme danger. The only treatment that can be attempted without medical assistance, is the employment of large injections by the lower bowel, and opium in moderate and repeated doses (¼ grain to 1 grain, or 12 to 20 drops of laudanum) by the mouth, carefully watched, and discontinued if there is any sign of narcotism. See OPIUM. C. pains are also present in Peritonitis (q. v.), another most dangerous form of disease; and they form one marked symptom of the slow poisoning by Lead (q. v.), occasionally observed as the consequence of contamination of drinking water by leaden cisterns, &c. In this form the treatment is different from that of simple C., and will be treated of under lead-poisoning.

COLIGNY, Gaspard de, a French admiral and general of eminence, was born at Châtillon-sur-Loing February 16, 1517. Introduced at court, he served under Francis I. in Italy, where he evinced great bravery. Under Henry II. he was made an infantry colonel, and in 1552, an admiral of France. On the death of Henry II., C., who had previously adopted the reformed faith, became, with the Prince of Condé, one of the great leaders of the Huguenots. In this capacity he was remarkable alike for his prudence and his bravery. He had the intelligence to plan, as well as the daring to execute, and above all, a heart that was not to be cast down by disasters. At the battles of Dreux and Jarnac, in the former of which Condé was taken prisoner, and in the latter killed, C.'s skill saved the remains of the Protestant army. When peace was concluded in 1570, C. went to Court and was apparently well received by the king (Charles IX.); but the enmity of the Guises, by whom C. was unjustly accused of murdering the Duke of Guise at the siege of Orleans, was stirred up against him, and an attempt was made by one of their menials to assassinate him on the street, August 22, 1572. This attempt at individual murder was but a preliminary to the general massacre of Huguenots which took place two days afterwards, and in which C. was basely slaughtered, his body being afterwards exposed to the vile outrages of the mob.

COLI'MA, a name of various application in Mexico.—1. A volcano of the Cordilleras, with an elevation of about 12,000 feet, in lat. 20° n., and not far from the western coast of the republic.—2. A territory of the Confederation, with (1868)

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3,333 inhabitants, extending about 100 miles along the coast; area about 3400 square miles.—3. The capital of the territory, comprising nearly the half of its population, stands in a fertile plain to the south-west of the volcano.—4. A seaport on the Pacific, about 40 miles to the south-west of the capital.

CO'LIN. See VIRGINIAN QUAIL.

COLL, one of the Western Isles of Scotland, off the west coast of Mull, and forming part of Argyleshire, and 2¼ miles north-east of Tiree Isle. It is 14 miles long from north-east to south-west, with an average breadth of 2¼ miles. More than a third of it is cultivated, or in pasture. The isle is low and rocky, and composed of gneiss, approaching to granite and hornblende slate. Pop. 728, engaged in agriculture and fishing.

CO'LLAR-BEAM, Strai'ning-Beam, &c., the horizontal tie connecting a pair of rafters. Large roofs have two or more collar beams.

CO'LLARING, the cylindrical part of the capital in the Doric and Tuscan orders. It is often termed the neck.

COLLA'TERAL (Lat. *collateralis*). See CONSANGUINITY, SUCCESSION.

COLLATERAL SECURITY, is an additional and separate security for the performance of an obligation, or the implement of a bond or covenant.

COLLA'TION, in the Law of England, is where a portion advanced by the father to a son or daughter is brought into *hotch-pot* (q. v.), in order that the beneficiary may have an equal share of his personal estate at his death. C. in this sense corresponds to the C. amongst younger children in Scotland. But in that country there is also the C. between the heir and executor. If the heir accept the heritable (real) estate of the deceased, however small it may be, he has no claim to share in the executry or movable (personal) succession; but should he consider it for his interest, he may claim the share of the movable estate which falls to him as next of kin, on condition of his ceasing to be heir by collating the heritage with the executors. The privilege is not confined to a son, but extends also to brothers and other collaterals.

COLLATION TO A BENEFICE is the act of bestowing a benefice by the bishop or other ordinary, where he has right of patronage. When a bishop *confers*, or collates to a benefice, presentation and institution are both comprised in the act of collation.

CO'LLÉ, a town of Italy, situated on the Elsa, about 22 miles south-south-west of Florence. A steep ridge separates the town into two portions, the lower of which is chiefly occupied by manufactories. C. has a cathedral and castle, and its paper-manufacture is extensive. Wine, olive oil, and silk are produced in the environs. Pop. 5006.

CO'LLECT, a name of uncertain origin, given to certain short prayers in different church liturgies. It is from the Latin *colligere*, as some ritualists think, because of the comprehensive brevity of such prayers, the matter of the epistle and gospel, e. g., being gathered up, or *collected*, into the C. for the day, as appears in the English Common Prayer Book. Others, with more probability, ascribe to the name an origin from an ancient practice of the chief minister collecting into a single brief prayer at the end of the service the previous devotions of the people; accordingly, one of the service-books of the ancient Catholic Church was called *Collectarium*, as containing such prayers. Of the collects used in the liturgy of the Church of England, some are taken from the old Roman Missal, and were probably the composition of St. Jerome; others are of more ancient and primitive times, and a few were composed at the Reformation. They begin with commemorating some attribute of God, or pleading some infirmity or necessity of man, and end with a simple petition based thereupon. Hence it will be seen that the practical teaching of a church may to a great extent be seen in its collects. For every Sunday, there is a proper C., with corresponding epistle and gospel; and this C. stands for every day in the following week, except in the case of festivals and their eves or vigils, which have collects of their own.

COLLECTIONS AT CHURCHES. The collections which are still made at all

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churches in Scotland—either at the church-doors before the service, or in the church after it—were, till a comparatively recent period, the principal fund for the support of the poor. By a proclamation of the Privy Council of 29th August 1693, it was ordered that one-half of the sums so collected, and of dues received by the kirk-session, be paid over into the general fund for the support of the poor. The other half has generally been applied for the relief of sudden or temporary distress. By the Poor-law Act (8 and 9 Vict. c. 83), it is enacted (s. 54) that in all parishes in which it has been agreed that an assessment shall be levied for the relief of the poor, all moneys arising from the ordinary church collections shall in future belong to, and be at the disposal of, the kirk-session; provided, however, that they shall be applied to no purposes other than those to which they were, in whole or in part, legally applicable before the date of the act. A power is reserved to the heritors to examine the accounts of the kirk-session, and to inquire into the manner in which the collections are applied; and the session-clerk is enjoined to report annually as to the application of the moneys, to the Board of Supervision.

The collections made at dissenting meeting-houses, under which denomination Episcopal chapels are included, are entirely at the disposal of the congregations.

In England there are no regular C. at churches as in Scotland. The alms collected in chapels, as well as in parish-churches, during the reading of the offertory, are declared by the rubric to be at the disposal of the incumbent and churchwardens the parish, and not of the minister or proprietor of the chapel. If the minister and churchwardens disagree as to the distribution of the alms, they shall be disposed of as the ordinary shall appoint. See OFFERTORY.

CO'LLEGE (Lat. *collegium*, a collection or assemblage). In its Roman signification, a C. signified any association of persons for a specific purpose. In many respects it was synonymous with *corpus*, a body or collection of members, a corporation—with *universitas*, a whole as contrasted with its parts—and with *societas*, a company or partnership, as opposed to all the members of which it was composed. A Roman C. had a common chest, and it could sue and be sued in the name of its manager (actor or syndicus), just like an incorporation with us. It required also to be incorporated by some sort of public authority, springing either from the senate or the emperor. A C. could not consist of fewer than three persons, according to the well-known maxim. "three make a college" (Dig. 50, tit. 16, l. 85). Some of these colleges were for purely mercantile purposes, but there were others which had religious objects in view, such as the *Collegia Pontificum, Augurum*, &c., and which thus made a sort of approach to a C. in the modern sense. With us, a C. is an incorporation, company, or society of persons, joined together generally for literary or scientific purposes, and frequently possessing peculiar or exclusive privileges. See PHYSICIANS, COLLEGE OF; SURGEONS, COLLEGE OF. Very often in England a C. is an endowed institution connected with a university, having for its object the promotion of learning. In this relation, a C. is a sub-corporation, i. e., a member of the body known as the University. The constitution of a C. in this, its most general and proper sense, depends wholly on the will of the founder, and on the regulations which may be imposed by the visitor (q. v.) whom he has appointed. For a more detailed account of C. in this sense, see UNIVERSITY, OXFORD, CAMBRIDGE, PARIS, EDINBURGH, &c. In Scotland and in America, the distinction between the C. as the member, and the university as the body, has been lost sight of; and we consequently hear of the one and the other indiscriminately granting degrees, a function which in the English and in the original European view of the matter belonged exclusively to the university. Where there is but one C. in a university, as is the case in all the universities of Scotland, the two bodies are of course identical, though the functions which they perform are different. In Germany, there are no colleges in the English sense; and though the universities in that country perform precisely the same functions as in Scotland, the verbal confusion between the C. and the university is avoided by the latter performing the functions of both in its own name, as two separate parts of its proper duties. In France, C. has a meaning totally different from that which we attach to it: it is a school, corresponding, however, more to the gymnasium (q. v.) of Germany than to the grammar-school of this country. All the colleges are placed under the university of France, to which the centralising tendencies of that country have given a meaning which also differs widely from that which the term university bears in England. See UNIVERSITY OF FRANCE.

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COLLEGE OF ARMS. See HERALDS' COLLEGE.

COLLEGE OF JUSTICE, in Scotland, which was formed on the model of the Parliament of Paris (q. v.), consists of the supreme civil court (see COURT OF SESSION), with all its members and officers. The title occurs in the statute 1587, c. 36; and in 1540, c. 93. the judges are styled senators. The present members of the C. of J. are, in addition to the judges, advocates (Anglicè, barristers), clerks of session, clerks of the bills, &c.; writers to the signet, solicitors before the supreme courts (not solicitors at law), depute-clerks and their substitutes, &c.; clerks of Exchequer, directors of Chancery, and their depute and clerks, the writer to the privy seal and his depute, clerks to the general registers of sasines and hornings, macers of the Court of Session, the keeper of the minute-book, the keeper of the rolls of the Inner and Outer House, one clerk to each judge, one clerk to each advocate, the extractors in the Register House, and the keeper of the Advocates' Library. In addition to the above, the keeper of the judicial records, the assistants to the principal clerks of session, the auditor of the Court of Session, and the collector of the fee-fund, are members *ex officio* by 1 and 2 Geo. IV.

COLLEGIATE CHURCHES—so called from having a college or chapter, consisting of a dean and canons, attached to them—differ from cathedrals in that the see of the bishop is at the latter. The service is or should be the same in both. They are under the jurisdiction of the bishop of the diocese in which they are situated, and he exercises visitorial powers over them. Those remaining in England are Westminster, Windsor, Wolverhampton, Heytesbury, Southwell, Middleham; also Brecon in Wales, and Galway in Ireland. Ripon and Manchester have been constituted the cathedrals of the new dioceses. Some churches called collegiate (as Beverley) have no chapters.

COLLIER, Jeremy, a celebrated nonjuring clergyman, was born in Cambridgeshire on the 23d September 1650. He went to Cambridge in 1669, and took his degree of M.A. in 1676. At the revolution of 1688, he first plunged into the stormy waters of controversy, his foeman being Burnet, afterwards Bishop of Salisbury. For a publication of his at this time, entitled "The Desertion Discussed," which gave offence to the government of William, he was sent to Newgate, where he remained several months. On his release, he rushed anew into the wars of party, and distinguished himself therein by the publication of several controversial works. Suspected of being a partisan of the Stuarts, he was again arrested in 1692, and imprisoned for a short time in the King's Bench. From this period, his life was a scene of perpetual literary strife, government being the principal object of his attack. He died in London, 26th April 1726. C. wrote many books, including the "Ecclesiastical History of Great Britain;" but the work by which he is best known, is his "Short View of the Immorality and Profaneness of the English Stage," published in 1698. Congreve and Farquhar came to the rescue of their craft, to the great delight of C., who was never happier than when wielding the satirical whip, and who had no objection to encounter a couple of opponents at a time. The combat lasted for ten years, and at the close, C. remained master of the field. His strictures on the stage were needed at the time, and his writings materially aided its subsequent purification. He was engaged in strife up to the close of his career, and died almost with arms in his hands.

COLLIER, J. Payne, a well-known Shakspearian critic and commentator, was born in London in 1789. In 1820, he published "The Poetical Decameron," in 2 volumes. From 1825 to 1827, he superintended a new edition of Dodsley's "Old Plays," in 12 volumes. Mr. C., whose position in connection with the library of the Duke of Devonshire, gave him great advantages for the study of our early dramatic literature, published in 1831, in 3 volumes, what may safely be called his best work, a "History of English Dramatic Poetry to the Time of Shakspeare, and Annals of the Stage to the Restoration." From 1835 to 1839, he published, also in 3 volumes, "New Facts regarding the Life and Works of Shakspeare." He also gave to the public an edition of the works of the illustrious Bard of Avon (1842—1844). Not content with these efforts for the illustration of his favorite author, Mr C., in 1852, published a volume, entitled "Notes and Emendations to the Text of Shakspeare's Plays, from early manuscript Corrections in a Copy of the Folio of 1632, in the Possession of J. P. Collier." This publication excited great commotion in the literary world; opinion was divided, and the "Emendations" were furiously ap-

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plauded or furiously assailed. It was in time generally admitted, that many of them were just corrections of typographical errors; that many, in cases where the author's meaning was doubtful, displayed very remarkable ingenuity; but that others darkened texts which, save to a commentator, were transparent enough. Later, it was even alleged by some that C. had himself written the marginal emendations in a feigned hand. In 1866, he commenced a series of reprints of our early poets and pamphleteers. His last work is his "Bibliographical Account of Rare Books" (1865).

COLLI'N, or Kolli'n, a town of Bohemia, picturesquely situated on the left bank of the Elbe, about 39 miles east-south-east of Prague, on the railway between that place and Vienna. It is surrounded by walls, is well built, and has an old castle, and manufactures of cotton and potash. Carnelians, garnets, and topazes are found in the neighborhood, and polished here. Pop. 9460. In the vicinity was fought, in 1757, the famous battle in which Frederick the Great was defeated by the allied Austrian and Saxon armies under Marshal Daun.

CO'LLINE is a term applied to common gelatine, or Glue (q. v.).

CO'LLINGWOOD, Cuthbert, Admiral Lord, was born at Newcastle-upon-Tyne, 26th September 1750. Sent to sea as a midshipman at the age of eleven, his life thenceforth, with the exception of some half-dozen years, was spent wholly on board ship. He was an intimate friend of Nelson, whom he followed up the ladder of promotion step by step, until Nelson's death left the topmost round vacant for himself. Among the great naval victories in which C. bore a prominent part, were those of Lord Howe off Brest in June 1794; of Lord Jervis off Cape St Vincent in 1797; and of Trafalgar in 1805, where he held the second command. In the last-named engagement, his ship was the first to break through the line of the combined French and Spanish fleets; and after Nelson had received his death-wound, he assumed the chief direction, and completed gloriously the triumph which had been so daringly commenced. A peerage was his reward for his gallant conduct in this battle. After several years' able service in the Mediterranean, C. died at sea, March 7, 1810. He was a thorough seaman, unsurpassed, if not indeed unequalled, by any officer in the navy. He never permitted his ardent courage to outrun his cool judgment. At once firm and mild in command, the seamen appropriately called him their father; while his private virtues and generous kind nature endeared him to all who came in contact with him as equals.

CO'LLINS, Anthony, an able free thinking writer on religious questions, was born in 1676 at Heston, near Hounslow, in Middlesex. He studied at Eton, and afterwards at King's College, Cambridge. In 1707 he published his "Essay concerning the Use of Human Reason;" and in 1709 his "Priestcraft in Perfection," &c., which flattered the churchmen of that time exceedingly. The controversy excited by this last work, induced C. to write his "Historical and Critical Essay on the Thirty-nine Articles." His next work was a "Vindication of the Divine Attributes," in reply to the Archbishop of Dublin, who asserted the compatibility of Divine Predestination and Human Freedom. C. was a philosophical Necessitarian, and afterwards advocated his opinions more fully in his "Philosophical Inquiry concerning Liberty and Necessity" (1715). In 1717 he went to Holland, where he made the friendship of Le Clerc and other eminent *literati*. On his return to England he published his "Discourse on Free-thinking," the best known and the most important of all his works. In 1718 he was made treasurer for the county of Essex; and in 1724 appeared his "Grounds and Reasons of the Christian Religion," which gave occasion to no less than thirty-five replies. Two years later he defended himself in his "Scheme of Literal Prophecy;" and in 1727 published his last work, a reply to Dr. Roger's "Eight Sermons on the Necessity of Revelation and the Truth of Christianity." C. died December 1729. He was a friend and correspondent of Locke, who declared that "C. had as much love of the truth for the truth's sake, as ever he had met with in anybody." His character for integrity and benevolence stood very high.

COLLINS, William, a poet of considerable merit and reputation, was born December 25, 1721, at Chichester, where his father was a hatter. He received his education at Winchester College and Oxford. In 1742, he published a small volume containing the "Oriental Eclogues," and the "Epistle to Sir Thomas Hanmer." These are not so characteristic of his genius as his later writings. Although the publica-

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tion was not attended with success, he resolved upon a literary career, and with this object went to London in 1744. Here, from time to time, he published other poems, chiefly consisting of odes; but misfortunes, occasioned chiefly by his own indolence and irresolution, finally rendered him a prey to melancholy, which at times deepened into insanity. This has imparted an interest to his memory which his works alone might not have been able to excite. He died at Chichester in 1756. The poems which he has left are comparatively few; but they entitle him to no mean rank among the poets of the 18th century. He was essentially a lyrical poet; and it is upon his odes that his reputation is principally founded. All his best qualities are exhibited in the well-known ode on "The Passions"—a poem which, at the time it was written, was undoubtedly one of the finest odes in the language. The personification of the passions is true and striking, and the variation of the measure is well adapted to the various emotions to be expressed. Among his other pieces may be mentioned his odes "To Liberty," "To Mercy," "To Evening," "Ode written in 1746," and the first part of the ode "To Fear."

COLLINS, William, R.A., a distinguished English artist, was born in Great Titchfield Street, London, September 18, 1787. C. early displayed a decided taste for art. In 1807 he entered the Royal Academy as a student, and in the same year he exhibited two pictures at the Academy's exhibition. At first, necessity obliged him to devote himself to portraits, but money coming in rapidly, he was soon able to give his genius its bent; and his children swinging on gates, his children gazing in delighted wonderment on the newly discovered nest, his coast-scenes, his groups of prawn-fishers, his shrimpers on the ebbed sea-beach, drew admiring eyes as they hung on the Academy walls, and brought remunerative prices. C. was elected R.A. in 1820. In 1836 he visited Italy, and remained there nearly two years, studying the great masters, and sketching monks and peasants, and groups of bronzed children. In 1839 he sent to the Academy several Italian pictures, which were greatly admired. His attempts in another direction—"Our Saviour with the Doctors in the Temple" (exhibited in 1840), and "The Two Disciples at Emmaus" (1841)—were not particularly successful, and he wisely fell back on his green fields, his sea-beaches, his rustics, and his children at their games. His death took place in London on the 17th February 1847.

COLLINS, William Wilkie, son of the preceding, was born in 1825, and was educated for the bar. He is widely known as a novelist and miscellaneous writer. He is a great master of mystery, and can so hide a secret in a wrappage of circumstance, that, before it is discovered, the whole tissue must be unrolled. Several of his works are models of construction; and in working out his plots, he diverges neither to left nor right, indulging neither in irrelevant pathos nor description. His principal works are "Antonina," "Basil," "Hide and Seek," "After Dark," "The Dead Secret," and "The Woman in White" (1860), "No Name," "My Miscellanies," "Armadale," "The Moonstone," "Man and Wife" (1870), "The New Magdalen" (1873), and "The Law and the Lady" (1875).

COLLISIONS OF VESSELS. To prevent vessels running against one another in passing, there is a "rule of the road" at sea as well as on land. The Trinity House lays down regulations which, though not having the force of law, are recognised by the Admiralty. They are too technical to be given here; but, in general they are analogous to the rules observed by pedestrians in crowded thoroughfares, and by vehicles on highways. It is at night that the danger of collision is greatest; and hence the necessity for a well-arranged system of lights and other precautions. Of 8590 casualties of all kinds on and near the coasts of the United Kingdom in 1874–5, 659 were due to collisions; of these 61 resulted in total loss. The average of the results of collisions for the 10 years 1865—1875 gives: total loss, 81$\frac{2}{10}$; partial damage, 345$\frac{8}{10}$.

COLLO'DION (Gr. *kollao*, to stick). This substance, on its first introduction, employed in surgery as a preservative of wounds, &c., from contact of air, by means of the tenacious and transparent film which it leaves on evaporation—and now, also, in a slightly modified form, remarkable as the basis of a highly sensitive process for taking pictures by the agency of light—may be defined as a solution of

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Pyroxyline in a mixture of alcohol and ether, to which is added, for photographic operations, a small quantity of some soluble iodide, bromide, or chloride.

The first step in making C. is the preparation of pyroxyline: Take ten fluid ounces of sulphuric acid, specific gravity 1·84, in a dish; add 12 fluid drachms of water, and 10 fluid ounces of nitric acid, specific gravity 1·45; and raise the temperature to 140° by immersing the dish in boiling water. One ounce of pure linen or paper should now be immersed in small pieces at a time, keeping the mixture in motion until the liquid is nearly absorbed by the linen or paper.

The action having continued for about ten minutes, the contents of the dish should be plunged into a vessel containing a large quantity of water, which should be speedily poured off and repeatedly changed, until the linen or paper is so thoroughly washed as not to give the slightest indication of acid to the most delicate test-paper, after which it should be slowly dried at a low temperature, and preserved in a glass bottle for use.

One hundred and four grains of the pyroxyline thus prepared are dissolved in a mixture of 16 oz. of pure sulphuric ether, and 2 oz. alcohol, specific gravity ·840; and to this mixture are added 48 grains iodide of cadmium, 30 grains iodide of potassium, and 25 grains bromide of cadmium, dissolved in 4 oz. of alcohol, of specific gravity ·840. C. thus prepared should, after becoming clear by subsidation, yield a rich creamy film of iodide and bromide of silver on immersion in the nitrate bath.

The foregoing formula yields a C. very suitable for taking what are termed *negative* impressions in the camera; but when it is desired to take *positive* pictures, cotton wool should be substituted for linen or paper in the preparation of the pyroxyline, and the iodising solution should contain iodide of ammonium instead of iodide of potassium. It is important also that the alcohol employed should be free from organic impurities in the shape of fusel and grain oils, small traces of which mar the purity of the high lights in a positive, though their presence is comparatively harmless in a negative photograph. For the details of manipulation involved in, and apparatus required for, the practice of the C. process, the reader is referred to the excellent treatise by Mr Hardwich on that subject.

*COLLODIONI'SED PA'PER PRO'CESS. Paper being substituted for glass in this process, as a basis upon which to support the film, a great increase in portability is arrived at, as the sensitive sheets may be carried in a portfolio, and employed in the same manner as dry collodion plates. There are difficulties, however, in the way of its successful practice, which have prevented it from becoming as popular as it deserves to be. The following is a brief summary of the manipulations. Mr Corbin, the inventor of the process, ascertained that a peculiar collodion was requisite, the formula of which is as follows; ether, 650 parts; alcohol, 350 parts; pyroxyline, 15 parts; iodine, 1¼ part. The collodion so prepared is poured on the glass in the usual way, and sensitised in a bath containing only one per cent. of nitrate silver, and a half per cent. of nitric acid. The plate having remained in this bath about two minutes, is withdrawn, and freely washed with water; it is then immersed in a solution of one per cent. of iodide of potassium, to insure the complete decomposition of the whole of the free nitrate of silver not removed by the washing. A piece of negative paper is now coated with a solution of gelatine, containing six parts of gelatine to 100 parts water; the dimensions of the paper should be rather less than the glass, and the gelatinised side is brought into contact with the collodion film in a dish of water, any intervening water being expelled by passing a glass rod lightly over it. The edges of the collodion film which project beyond the paper are folded back on it, and the film and paper removed together. The now collodionised paper is laid, film uppermost, on a glass plate, coated with a preservative solution, composed of equal parts of albumen and honey, diluted sufficiently to enable it to flow freely over the paper. The film is lastly sensitised in a solution of nitrate of silver, 5 parts; glacial acetic acid, 5 parts; water, 100 parts; it is then freely washed as before in water, and hung up to dry. As it is apt to wrinkle in drying, it should be attached by all four corners to two lines, running one under the other.

COLLOT D'HERBOIS, Jean Marie, one of those men who gained an infamous notoriety in connection with the first French Revolution, was born in Paris in 1750.

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Originally a provincial actor, the revolutionary movement attracted him to Paris, where his impudence, his loud voice, and his "Almanach du Père Gérard, which obtained the prize of the Jacobin Club, secured for him public recognition, and he was elected to the National Convention as one of the deputies for Paris. His general ferocity marked him out as a fit person for the presidency of the Convention, to which he was appointed June 18, 1793, and as a member of the murderous Committee of Public Safety. Sent by Robespierre to Lyon in November 1793, C. took bloody revenge on the inhabitants for having once hissed him off the stage in the theatre. Not less than 1600 persons were destroyed by the guillotine and by discharges of grape-shot. An attempt made to assassinate C. (May 23, 1794) served only to increase his popularity, and thus excited the envy of Robespierre, who determined to destroy so formidable a rival. C. therefore took a prominent part in the overthrow of Robespierre and his party in July 1794, but the reaction following this event proved fatal to himself. C. was expelled from the Convention, and in March 1795 was sentenced to deportation to Cayenne, where he caught a fever, and died in great agony, January 8, 1796. Besides revolutionary pamphlets, C. wrote a great number of dramas, now utterly forgotten.

COLLU'SION, an agreement between two or more persons to defraud. The law abhors C., and consequently it has the effect of voiding every transaction which is founded upon it. Arrangements between bankrupts and creditors whom they wish to favor, on the eve of bankruptcy, are amongst the most frequent instances of C., and one of the leading objects of all systems of bankrupt law has been to defeat them. In England, C. is spoken of as "a deceitful agreement or contract between two or more persons, for the one to bring an action against the other, to some evil purpose, as to defraud a third person of his right."—"Tomlin's Dictionary." But there is no limit to the circumstances in which the occurrence of C. is conceivable in any country.

COLMAN, George, commonly called "the Elder," a dramatic author and theatrical manager of last century, was born at Florence about 1733. In 1760, his first dramatic piece, entitled "Polly Honeycomb," was produced at Drury Lane with great success. Next year, he gave to the world his comedy of "The Jealous Wife," and in conjunction with Mr Garrick, he in 1766 wrote "The Clandestine Marriage." In 1761, he became one of the purchasers of Covent Garden Theatre, and held the office of acting manager for seven years, after which period he sold his share. In 1777, he purchased the theatre in the Haymarket from Mr Foote. In 1785, he was attacked by palsy, and never recovered; he died August 14, 1794. C. was an industrious author; besides poetry and translations, he wrote and adapted upwards of thirty dramatic pieces.

COLMAN, George, "the Younger," son of the preceding, was born October 21, 1762. His bent lay in the same direction as his father's, during whose illness he acted as manager of the Haymarket Theatre; and on the death of the elder Colman, George III. transferred the patent to his son. C. held, for a considerable time, the office of examiner of plays. In industry, he rivalled his father, and he received large sums for his dramatic writings, some of which continue in possession of the stage. He was twice married, and died on the 26th October 1836. His last literary work was "Memoirs," published in two volumes.

COLMAR, a city ceded to France in 1697, and repossessed by Germany since 1870, the capital of Upper Alsace, stands on a plain near the Vosges, 41 m. n.n.e. of Strasburg. A stream of water from the Lauch and Fecht, at the confluence of which the town stands, flows through and keeps the streets clean. Among the principal buildings of C. are the cathedral, the Dominican church, the college, courthouse, and town-house. C. is a busy place—one of the chief seats of the cotton manufacture in Alsace. Water, being abundant, is the principal motive-power in driving the machinery, but steam is also employed to a considerable extent. Other manufactures are paper, leather, ribbons, and hosiery. C. is an old place, having been raised to the rank of a city in 1220. About the end of that century, it was made a free town, and rapidly became one of the most prosperous in Upper Alsace. Fortified in 1552, its fortifications were razed in 1673 by Louis XIV. Pleasant boulevards now occupy their place. Pop. (1875) 23,778.

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COLNE, a town in the east of Lancashire, on a high ridge near the source of the Calder, a western branch of the Ribble, 32 miles northeast of Manchester, at the junction of the Lancashire and Yorkshire and Midland Railways. It has manufactures of cotton calicoes, and mousselines-de-laine. Coal, slate, and lime abound in the vicinity. Pop. (1871) 7835. C. is an ancient place, by some supposed to be the *Colunio* of the Romans. Many Roman coins have been found here. As early as the beginning of the 14th c., it was the seat of woollen manufactures.

CO'LOCYNTH (Gr. *kolokynthis*), a well-known medicine, much used as a purgative, is the dried and powdered pulp of the *Colocynth Gourd, Coloquintida, Bitter Apple*, or *Bitter Cucumber*, a globose fruit about the size of an orange, of a uniform yellow color, with a smooth, thin, solid rind. The plant which produces it, *Cucumis* (or *Citrullus*) *Colocynthis*, is nearly allied to the cucumber (q. v.) It is common in Asia, Africa, and Spain, which last country supplies no small part of the C. of commerce. The fruit is gathered when it begins to turn yellow, peeled, and dried quickly, either in a stove or in the sun. It is chiefly in the form of a dried extract that it is used in medicine. It owes its properties to a bitter principle called *Colocynthine*, which is more or less abundantly present in the fruits of many of the gourd family. It is a curious fact, but to which there are many analogous, that the seeds of the C. plant, produced in the midst of its medicinal pulp, are perfectly bland, and they even form an important article of food in the north of Africa.—The name False C. is sometimes given to the Orange Gourd (*Cucurbita aurantia*), sometimes cultivated as an ornamental plant in our gardens, on account of its globose, deep-orange fruit. The pulp of the fruit possesses the properties of C., but in a milder degree.

C. is generally administered in the form of pills, in which the extract is associated with aloes, scammony, and in some cases with calomel or with extract of hyoscyamus. In small doses, the C. acts as a safe and useful purgative; and when accompanied by hyoscyamus, the latter prevents much of the pain and griping which are attendant on the use of C. by itself. In large doses, C. is a poison.

COLO'CZA, or KALOCSA, a town of Hungary, situated on the left bank of the Danube, 68 miles south of Pesth. It has an archiepiscopal palace or castle, and a cathedral. Pop. (1869) 16,302, who are chiefly engaged in the fisheries on the Danube, and in the breeding of cattle. There is a steam-packet station at Colocza.

COLO'GNE (Ger. *Köln*; the *Colonia Agrippina* of the Romans), a city and free port on the left bank of the Rhine, in lat. 50° 56′ n., long. 6° 58′ e. Formerly an independent city of the German empire, it is now the capital of Rhenish Prussia. C. is a fortress of the first rank, forming a semicircle, with the Rhine as its chord, and the town of Deutz on the opposite bank as a tête-du-pont. It is connected with this suburb by a bridge of boats, and a fine iron bridge 1362 feet in length, for railway and carriage traffic. Pop. (1871) 129,233, only 16,746 of whom were Protestants; (1875) 135,518. The streets are mostly narrow and crooked. The public buildings are numerous, including a number of educational and of charitable institutions. The church of St. Ursula is noted as the place where are preserved the bones of 11,000 virgins, companions of St. Ursula, who, according to the legend, were slaughtered at C. by the Huns, because they refused to break their vows of chastity. In the "golden chamber" are the coffin of the saint, and the skulls of a few of her most favored maidens encased in silver. The church of St Gereon, the first portion of which was founded in 1066, boasts of the possession of the bones of St Gereon, and of the 6000 Theban martyrs slain during Diocletian's persecution. The church of St Peter is celebrated for the altar-piece of the crucifixion of St Peter by Rubens, and that of the Minorites for containing the tomb of the famous scholastic, Duns Scotus. The chief object of interest in the city, however, as well as its greatest ornament, is the cathedral, one of the noblest specimens of Gothic architecture in Europe. This cathedral is said to have had its origin in an erection by Archbishop Hildebold, during the reign of Charlemagne in 814. Frederick the Red-bearded bestowed upon it, in 1162, the bones of the three holy kings, which he took from Milan, and this gift contributed greatly to the increase of its importance. The bones are retained as precious relics to this day; but the old structure was burned in 1248; according to some accounts, the present cathedral was begun in the same year, but others fix the date of its commencement in 1278—1275. To whom the design of this noble building is to be ascribed, is uncertain.

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The choir, the first part completed, was consecrated in 1322. The work was carried on, sometimes more actively, sometimes more slowly, till the era of the Reformation, when it was suspended; and during the subsequent centuries, not only was nothing done to advance it, but what had been already executed, was not properly kept in repair. In the beginning of the present century, however, attention was directed to its unrivalled beauties, and it has since become the subject of an enthusiasm extending over all Germany, and which has given birth to a multitude of associations for the supply of the necessary funds to repair and complete it according to the original design. Funds have also been forthcoming from other parts of Europe. On September 4, 1842, the king of Prussia, who had contributed largely to the funds, laid the foundation-stone of the transept, since which time great progress has been made. The naves, aisles, and transepts were opened in 1848. The magnificent south portal was completed in 1859, and the north has also been finished; and in 1860, the iron central spire was added. With the exception of the towers, the whole was finally completed in October 1868. The body of the church measures 500 feet in length, and 230 feet in breadth. The towers, when finished, will be upwards of 500 in height. The cost of the restoration is estimated at £750,000.—The situation of the city is extremely favorable for commerce, and it has long possessed a considerable and increasing importance in this respect. Various branches of manufacture are carried on, such as cotton-yarns, woollens, velvets, silk fabrics, &c., but Eau-de-Cologne (q. v.) is the most remarkable. In 1870, 7817 vessels, of 215,531 tons, traded at the quays of Cologne. The C. and Minder and the Rhine Railways facilitate its busy traffic. A new line to Hamburg by Venloo supplies a means of transit long wanted.—The city was founded by the Ubii, about 37 B.C., and was at first called *Ubiorum oppidum*; but a colony being planted here in 50 A.D. by Agrippina, the wife of the Emperor Claudius, it received the name of *Colonia Agrippina*. At the partition of the Frank monarchy in 511, it was included in Austrasia; and by a treaty in 870, was united to the German Empire. It entered the league of the Hanse towns in the beginning of the 13th c., and contended with Lübeck for the first rank. It was at a very early period the seat of a bishopric, which was elevated, in the end of the 8th c., into an archbishopric, and the archbishops acquired considerable territories, some of them distinguishing themselves as politicians and warriors. They took their place amongst the princes and electors of the empire, but were involved in a protracted contest with the citizens of C., who asserted against them the independence of the city, and the archiepiscopal residence was therefore removed to Bonn. The archbishopric was secularised in 1801, when the city also lost its independence, and the congress of Vienna did not attempt to restore to it its former character, but assigned the whole territories to Prussia. The archbishop, therefore, has not now the political rights and power that belonged to his predecessors.

COLOGNE YELLOW is a pigment composed of 2 parts of yellow chromate of lead, 1 of sulphate of lead, and 7 of sulphate of lime or gypsum.

COLOMBA'NO, San, a town of North Italy, in the province of Milan, on the right bank of the Lambro, about 10 miles south of Lodi. It is situated in the midst of hills, in which are found porphyry, feldspar, and fine red granite, and also limestone containing numerous fossils. Pop. 6000.

COLO'MBIA, immediately after the war of independence, was a term which embraced all that now belongs to the three republics of Venezuela, United States of Colombia, and Ecuador, being the entire north of South of America, and the extreme south of what is geographically distinguished as Central America. Independently of the singular difficulties of communication, and of the resulting absence of anything like natural unity, this unwieldly state contained, from the beginning, the cause of its own dissolution in the national character of its inhabitants. So long as union was necessary to meet external dangers C. maintained an imposing attitude in the eyes of the world; but, gradually, sectional interests and political jealousies did their work, and, at last, about 1830, the ill-assorted elements of the confederation were separated for ever.

COLOMBIA, United States of, the official title, since 1861, of what was formerly called New Granada (q. v.)

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COLOM'BO, the capital of Ceylon, an episcopal city and seat of government, is situated on the western side of the island, in 6° 59′ n. lat., and 80° 4′ e. long., near a rocky headland, the *Jovis Extremum* of Ptolemy, by which the mariners of antiquity steered for the port of Galle. The modern fortifications of C., which were constructed by the Dutch, include, on the land-side, four bastions with counterscarps and ravelins, and towards the sea, seven batteries. Except the military officers, few Europeans reside within the fort. Colpetty, a beautiful suburb, shaded by groves of the cocoa-nut palm, is a favorite retreat. Here, the houses are chiefly of one story, with broad verandahs. The large and lofty rooms are furnished with punkahs, floored with tiles, and for the sake of air, have windows opening to the ground, at which, however, snakes, lizards, scorpions, and the teeming insects of a tropical country, make free to enter. The humble, mud-constructed dwellings of the Dutch, Portuguese, Eurasians, Singhalese, Tamils, Moors, and Malays are outside the city walls. The *pettah* or Black Town, the only ancient quarter, extends to the river Kalany-ganga. Pop. (1871) 100,238. C. is connected with Kandy by railway. The mean annual average of temperature at C. is 80°, or thereabout, and has reached to 86° in extraordinary years. The annual fall of rain is 72·4 inches, of which the greatest quantity is measured at the change of the monsoon, when it pours down in a perfect deluge. Out of 72.4 inches, 20·7 fall in April and May, and 21·9 in October and November.

The early name of C., Kalan-totta, the "Kalany Ferry," so called from its proximity to the river, the Moors corrupted into Kalambu, and by this designation it was described in 1340 A. D. as the finest city of Serendib. At the arrival of the Portuguese, who fortified it 1517 A. D., Kalambu had merged into Kolamba or Columbu, which they henceforth wrote Colombo, in honor of Christopher Columbus. The Dutch succeeded to the Portuguese (see CEYLON), and C. was taken by the British, 16th February, 1796.—Sir James Emerson Tennent's "Ceylon."

CO'LON. See PUNCTUATION.

COLON, that portion of the large intestine which extends from the Cæcum (q. v.) to the rectum, which is the terminal portion of the intestinal canal. Whether it is derived from *kolion*, "hollow," or *kolao*, "I arrest" (because the fæces are retained for a considerable time in it), is uncertain. It is divided into the ascending, the transverse, and the descending C., and the sigmoid flexure. See ALIMENTARY CANAL.

The whole length of the C., from its commencement in the cæcum, to its termination in the rectum, is rather more than four feet. It is retained in its position by the serous membrane, which envelops, more or less, all the intestinal viscera, and is termed the Peritoneum (q. v.). Its structure is essentially the same as that of the rest of the intestinal canal, which is described in the article DIGESTION, ORGANS AND PROCESS OF; but in consequence of a peculiar arrangement of the longitudinal muscular fibres, the interior of the C. is divided into sacculi, which serve to retain its contents for a longer period than if it were a uniform tube, and thus by extracting water from them, to reduce them to a more solid consistence, such as is possessed by normal excrement. In some animals, as in the horse and sheep, the shape of the fæces is completely moulded in these cells.

CO'LONEL (from the Italian *colonello*, the leader of a column) is the highest officer of a regiment; any grade above this converts him into a general-officer belonging to the army collectively, rather than to any one regiment. Before the reign of Elizabeth the chief officer of an English regiment was captain, but in 1585 the title of C. had become familiar. In the British army at the present day, except in the Artillery and Engineers, the office of regimental C. is a sinecure, the real active commander of the battalion being the lieutenant-colonel. The C. receives higher pay and dignity. The colonels are generals, who have had what is called a regiment "given to them," as a reward for long service, and virtually as a retirement. The pay, except in the Guards (where it is higher) is £1000 a year. The Army Estimates provide for about 150 regimental (otherwise called "honorary") colonels of cavalry and infantry, and for about a sixth of that number colonels commandant in connection with the Artillery and Engineers. There is a frequent outcry against these appointments when viewed as sinecures, but looked upon as retirements for deserving old officers there is little that is objectionable in them. The rank of C. was

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above those which were purchasable. See COMMISSIONS, ARMY. Apart from regimental rank there is the army or brevet rank of colonel, through which all officers must pass on the way to general-officer. It is attained by specified service in certain positions as lieutenant-colonel. In the Austrian, Prussian, and Russian armies, where the regiments are very large, the colonelcies are mostly honorary posts, held by emperors, kings, princes, and other distinguished persons.

COLO'NIA DO SANTI'SSIMO SACRAME'NTO, a port of Uruguay or Banda Oriental, stands on the north or left bank of the Plata, nearly opposite to Buenos Ayres, and about 100 miles above Monte Video, the capital of the state. The place is pretty regularly fortified. As its acquisition would tend to secure to Buenos Ayres the entire command of the interior navigation, the town was seized by Rosas, the dictator of that state; but, in the interest of the freedom of commerce, it was, in 1845, taken from him by the French and English squadrons.

COLO'NIAL CORPS were certain regiments forming part of the regular army of the British Empire, and paid for out of the imperial revenues. They were never very fixed in number, varying with the circumstances of the colonies in which they were located. The following were the names of the corps, the numbers provided for in the Army Estimates for 1860—1861, when these regiments were at their largest recent establishment, and the composition of each corps, whether British or native:

Three West India Regiments (afterwards raised to five)	3420	Negro.
Newfoundland Veterans	229	British.
Ceylon Rifles	1585	Native.
" Invalids	163	Native.
Cape Mounted Rifles	1084	Boers and natives.
Malta Fencibles	638	Native.
Canadian Rifles	1106	British.
St Helena Regiment	433	"
Gold Coast Artillery	351	Native.
Falkland Islands Company	37	British.
African Artillerymen	64	Native.
Hong-Kong Gun Lascars	88	"

These corps, comprising about 95 companies, had somewhat over 1000 officers, commissioned and non-commissioned, and about the same number of horses. All the corps were officered by British, except the Malta Fencibles. The Cape Mounted Rifles was a mounted infantry corps.

As the colonies obtained self-government, and the military theory of employing troops only in large bodies gained ground, it was considered as against imperial polity to maintain, out of imperial revenue, corps which were tied to one colony, and not available for the general defence of the Empire. Accordingly the colonial corps have been gradually disbanded, and there survive only two West India Regiments and the Malta Fencibles.

COLO'NNA, a village in Central Italy, is noticed because it gives its name to the most celebrated and powerful of all the Roman aristocratic families—the Colonna—from which have sprung a pope, several cardinals, generals, statesmen, and noted scholars.

The C. palace, situated at the base of the Quirinal (Rome), is celebrated for its splendid gallery and treasures of art.

COLONNA, Cape (ancient *Sunium Promontorium*), a headland of Greece, forming the southmost point of Attica, in lat. 37° 38′ n., long. 24° 1′ e. Crowned by the ruins of a temple of Minerva, its summit rising about 270 feet above the water, Cape C. is a conspicuous and remarkable object from the sea. Sixteen white marble columns, from which the cape derives its modern name, are still standing.

COLONNA, Vittoria, the most celebrated poetess of Italy, a member of the above-named family, was the daughter of Fabrizio Colonna, High Constable of Naples, at whose estate of Marino she was born in the year 1490. When four years old, she was betrothed to a boy of the same age, Fernando d'Avalos, son of the Marchese de Pescara. At 17, they were married. After her husband's death in the battle of Pavia (1525), Vittoria C. found her chief consolation in solitude and the cultivation of her poetical genus. During seven years of her widowhood, she re-

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aided alternately at Naples and Ischia, and then removed to the convent of Orvieto, afterwards to that of Viterbo. In her later years, she left the convent, and resided in Rome, where she died in February 1547. Her poems were chiefly devoted to the memory of her husband. Among them, the "Rime Spirituali" (Venice, 1548) are remarkable for truth of sentiment and enlightened piety. The most perfect edition of the poems of Vittoria C. was published by Ercole Visconti (Rom. 1840).

COLONNA'DE is the name given to a series of columns placed at certain intervals from each other, and arranged in various ways according to the rules of art and the order employed.

CO'LONSAY, one of the Western Isles of Scotland, off the south-west part of the mainland of Argyleshire, in the wide entrance of the Firth of Lorn, between the isles of Islay and Mull, with the small isle of Oronsay at the south end, separated by a narrow sound, which is dry at low water. C. and Oronsay are together 12 miles long from north-east to south-west, and one to three miles broad. The surface is irregular, and composed of mica-slate, passing into chlorite-slate and clay-slate, and mixed with quartz-rock and limestone. Half the surface is cultivated. Pop. (1871) 408. Next to Iona, C. contains the most extensive remains of religious edifices in the Western Isles. On Oronsay stands a large stone cross and the ruins of a monastery founded by the Lords of the Isles in the middle of the 14th c.

CO'LONY (Lat. *colonia*, from *colonus*), a husbandman; the first inhabitants of a C. being generally people of agricultural pursuits). The term is loosely used to embrace various classes of distant territories subordinate to or dependent on a parent state. A C., however, properly means a body of people formed by migration to a distant region, where they support themselves by industry and the produce of the soil, and are under the protection and attached to the supreme government of the mother-country. Our colonies in Australia and North America, where the natives have either ceased to exist, or do not compete with the colonists for the ownership of the soil, are practical instances of the C. in this its proper sense; but there are many other dependencies of the British crown which deviate more or less from the true characteristics of a colony. Gibraltar and Malta, for instance, are mere fortresses, not affording a profitable emigration-field for a portion of our population, but, on the contrary, requiring that such inhabitants of the United Kingdom as reside there shall be specially remunerated for doing so. The support of these dependencies is justified by the warlike, not the economic policy of the country. On the other hand, territories have afforded profitable residence to our people without being colonies; the most conspicuous of this class is the British Empire in Hindustan, where our people scarcely hold any land, or concern themselves in the occupation of agriculture, from which the term colonist is taken; but reside as the rulers and defenders of the native races. The ancient migrations of nations, by which our own islands, for instance, became peopled, apparently in the first place by Celts, and next by Goths or Teutons, were not colonization in the fullest sense of the term, since the parent-country kept no control over the settlers, and afforded them no protection. The Greeks were a spreading people, carrying with them their genius and their language. They established communities in Asia Minor, on the coast of Africa, in Italy, and in France; for instance, Marseille was a Greek town, founded by the inhabitants of Phocæa about six centuries before the Christian era. A close connection was maintained between these emigrant communities and the states from which they had removed. Still, however, none of these districts were colonies, according to the definition given above; and it was one of the many triumphs of the organizing genius of the Romans, to form the "C." according to its most perfect modern acceptation. The principle of responsibility to a central government was brought to its greatest perfection in the policy of Rome, and it was part of this policy that not only every conquered territory, but every district where Roman citizens settled, should be an integral part of the empire. The *colonia* was one of the municipal institutions of the empire, having its own governing corporation dependent on Rome. There were various grades of colonies—some where there was the high privilege of Roman citizenship, and others where the citizenship was of a humbler grade. Corresponding with the consuls in Rome, there were municipal officers in the colonies, representing, after the Empire was formed, the old republican institutions—these were called sometimes *duumviri*,

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and sometimes *quatuorviri*—terms, the special application of which has been matter of considerable discussion. The Romans appointed men of very high rank to the government of their provinces or colonies—men who had held such offices as the consulship or prætorship at home, and were called proconsuls or proprætors. It was a feature of the sagacious jealousy of the Roman system, to limit their period of government, lest they should become independent of the empire and establish separate states; and this idea is followed in the colonial system of the British empire at the present day.

After the fall of Rome, centuries passed before colonisation recommenced; for the various tribes who devasted the empire were not connected with any parent state, and the Normans, who spread themselves over Europe at a later period, were utterly unconnected in the countries where they settled, with the government of the northern states whence they migrated. It is curious that not a trace of the genealogy of the Normans of England or France can be found anterior to their settlement in the latter country, so little connection did they preserve with the country of their ancestors. The Spanish and Portuguese were the first among modern European states to establish colonies. Their sovereign aimed not only at the restoration of the Roman Empire in Europe, but at the creation of a new empire in America, which was looked on as the exclusive property of the Spanish crown. In carrying out this view, it was not so much that the people of the peninsula went to America, and had the necessary staff of civil and military officers sent to them by the parent state, as that great officers, with high rank and enormous salaries, were sent over to the new empire, and brought followers after them. The other governments of Europe—Britain, France, Holland, and the minor states—subsequently colonised in America and Africa, Denmark occupying the inhospitable shore of Greenland.

The earlier British colonies arose in the reverse order to those of Spain—the colonists went first, the dignitaries followed. Both Raleigh and Drake attempted to form settlements in America, but unsuccessfully. The British race there dates from the reign of James I. of England. The settlers were privileged companies, with royal letters-patent, but in reality, they were independent; and as they were dissenters seeking a place of refuge from what they considered the grievances of the established church and the government, they took care not to convey the grievance with them, as they would have done had they been actually incorporated with the British empire. The northern colonists, indeed, acted as if they were a sort of private corporation, occupying their own territory according to their own taste, and considered themselves entitled to prohibit any person differing from their religious and political opinions from entering their boundary. In later times, the example of Rome was more closely followed, and it became the policy of Britain, that any land acquired by her subjects by conquest or occupation, should be deemed to be held by them for the crown. This was strongly exemplified in New Zealand, where a body of energetic and spirited adventurers had projected something like a new empire, of which they were to be masters. Some of them had purchased large territories for a musket, a barrel of powder, or a piece of red cloth, and thought it hard that they should not be entitled to retain the fruit of their fortunate bargains. The crown, however, stepped in, asserted a supreme authority over the colony, and readjusted all its territorial rights, with a view to doing practical justice both to the natives and the settlers. There are many evils incident to any attempts at independent colonisation, among which, the chief is the cruelty and rapacity which it is the nature of such private adventurers to exercise against aboriginal tribes, and even against any other communities weaker than themselves who happen to fall in their way. The British colonists of the American continent and islands in the 17th c. were robbers and pirates on a large scale, and became memorable in history by the name Buccaneers. Colonists themselves, when they rightly appreciate their own interest, must see their advantage in the supremacy of the crown—or rather in that of the British parliament—for the crown is only properly supreme over a territory which has been taken by conquest from another civilised power. The supremacy implies a right to protection, much needed by small collections of men in distant regions; and it may be safely predicted, that had an independent body of British settlers established themselves in New Zealand, their C., when it rose to importance, would have been seized by France, or some other foreign power. After the

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example set by the United States, it is not likely that the supremacy will be continued after it ceases to be advantageous to both parties.

Many fallacies regarding colonies have been dispersed by the progress of political economy. It used to be thought, that the support of colonies at any price was an advantage to our trade, since it is more profitable to trade with our colonies than with foreign countries, because, among other reasons, they can be compelled, by restrictions and monopolies, to take our goods, while we take theirs; but other nations cannot, and may continue to sell to us without buying from us. We now know that the best trade for the country is that which the individual dealers in it find to be the best for themselves; and they will go where they can trade with most profit, whether to a C. or a foreign country. It was when the United States were rich and enterprising—not when they were our colonies—that we have driven the greatest trade with them. No doubt there must always be two parties in trade; and let a nation be as energetic and enlightened as it may, it will have no foreign trade unless there be some other than can afford and is inclined to deal with it. If the population of the United States were displaced by Red Indians, there would be a sudden collapse in the trade of Britain. For such a reason it is that we have an interest in seeing our own race—the most enterprising in the world—spread over its face. Every new British C. may be calculated on as a new market for our goods; and as a pecuniary speculation, it may be worth supporting a governor and a staff of officers to take charge of it.

CO'LOPHON, an Ionian city of Asia, about nine miles north of Ephesus, and near the sea-coast. The river Ales, noted for the coolness of its water, flowed past it. It is not often mentioned in history, although the birthplace of several poets, Mimnermus, the elegist, among others, and even claiming to be the native city of Homer. The Greek proverb, "to put the colophon to it," meaning to terminate an affair, is said to have originated in the boast of the famous Colophonian cavalry, that their *charge* was usually the finishing-stroke in battle. Hence, in old printed books, the conclusion, in which were stated the name of the author, and the place and year of printing, was called a colophon.

COLO'PHONY. See ROSIN.

COLOQUI'NTIDA. See COLOCYNTH.

COLORA'DO (Sp. red), the name of a state and also of two rivers of the United States. The state is bounded on the n. by Wyoming and Nebraska, e. by Kansas, s. by New Mexico, and w. by Utah. Its area is 104,500 sq. m., and the pop. in 1870 was 39,864, in 1874 estimated at 120,000. The Rocky Mountains intersect the state from n. to s., but it has large and fertile valleys. That of San Luis, in the south, is an immense well-wooded amphitheatre surrounded by mountains, with an area of 18,000 square miles. The mineral resources of C. are very great, and include gold, silver, copper, gypsum, coal, salt, iron, and limestone. Value of gold and silver product in 1875, 6,800,000 dollars. The chief rivers are the Arkansas, Grande del Norte, Grand Costilla, Yampa, and a fork of the Nebraska. Denver (the capital), Golden City, and Central City, are the principal towns. C. was formed into a territory in 1861, and admitted into the Union as a state in 1876.—Of the rivers named C., one is confined to the state of Texas, is 800 miles long, and falls into the Gulf of Mexico. The other rises in the Rocky Mountains, and enters the Gulf of California, about lat. 32° 10' n., and long 114° 20' w., after a course of 1200 miles.

COLORA'DO POTA'TO BEE'TLE (*Doryphora decemlineata*), a small beetle, which, since 1861, has done great harm to the potato crops of the United States. It is of a yellowish cream-color, with ten black lines running down the wing-covers. The *larvæ*, which do the principal mischief, are at first reddish brown, and get paler with increasing age.

COLO'SSÆ, a populous city of ancient Phrygia, on the river Lycos. Its inhabitants were noted for their skill in dyeing wool. C. was almost entirely destroyed by an earthquake, 65 A.D. To the Christians of C., Paul addressed one of his epistles.

COLOSSE'UM. See AMPHITHEATRE.

COLO'SSUS, a Greek word of unknown origin, used to denote a statue very

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greatly beyond the size of life. In English, the adjective colossal is used in a somewhat wider sense, to denote all statues which exceed the size of life, in however small a degree. Most statues are thus colossal, though of colossi, very few have been erected in modern times. The "Bavaria" (q. v.) at Munich is perhaps the only very celebrated example. The colossal was the peculiar characteristic of Egyptian art, and innumerable colossi were raised in Egypt, mostly of the hardest stone, many of them from 50 to 60 feet in height. The most celebrated is the vocal statue of Memnon (q. v.), in the plain of Thebes, described by Strabo and Pausanias, and supposed to be identical with the more northerly of the two existing colossi on the west bank of the Nile. But it was in the artistic world of Greece that the most famous colossi appeared: e. g., the bronze statute of Pallas Athene, on the Acropolis of Athens, the plume of whose helmet and the point of whose spear were landmarks to sailors between Sunium and Athens; another statue of the same goddess, of gold and ivory—then so-called Palladium in the Parthenon at Athens; and the Olympian Jupiter, of the same materials, the master-piece of Phidias, who was also the author of the two statues just mentioned. Amongst the seven wonders of the Old World, was reckoned the gigantic C. of Rhodes, representing Phœbus, the national diety of the Rhodians. It is said to have been commenced by Chares, of Lindus, a famous pupil of Lysippus, and terminated by Laches. They formed it of metal, which was cast in separate pieces, a process which lasted for twelve years, and was completed 280 B. C. Its height is doubtful—some making it 90 feet; others 90, and even 105 cubits. It cost 300 talents. Sixty years after its erection, it was thrown down by an earthquake. The Romans imitated the Greeks in the erection of these gigantic structures. The statue of Jupiter upon the Capitol, made from the armor of the Samnites, was so large that it could be seen from the Alban Hills. Then there was the bronze statue of Apollo, of which what is supposed to be the head is now in the Capitol; a bronze statue of Augustus, in the Forum; a C. of Nero, executed in marble, of the enormous height of 110 or 120 feet, from which the contiguous amphitheatre is believed to have derived the name of "Colosseum;" an equestrian statue of Domitian, in the centre of the Forum; and many others.

COLO'STRUM is the term applied to the first milk yielded after delivery. It differs very materially from ordinary milk, and generally appears as a turbid, yellowish, viscid fluid, similar to soap and water. When examined under the microscope, it is found to contain, in addition to the ordinary milk corpuscles (see MILK), peculiar conglomerations of very minute fat granules, which are hence known as colostrum corpuscles. The chief chemical difference between C. and milk is, that the former contains nearly three times more salts than the latter. It is probably this excess of salts that usually causes it to exert a purgative effect upon the newborn infant, and thus to remove the Meconium (q. v.) which had accumulated in the fœtal intestines.

CO'LOR, in Optics. See LIGHT, CHROMATICS, SPECTRUM.

COLOR, in Art, means either the pigment employed to produce a certain effect to the eye, or the effect thus produced, i. e., the tint of a picture. In the former sense, it is treated of in this work under the names of the colors themselves. See CARMINE, CHROME, &c. In the latter sense, C. must be regarded by the artist not so much as the result of the application of one or more pigments separately, as of their use in the innumerable combinations of which they admit. Synonymous with C. in this sense is the word *coloring*, which has come to be employed as a substantive, indicating the results of the art of combining and applying colors in the imitative arts.

Infinitely various as are the tints exhibited in coloring, it is remarkable that they all result from the combination of the three simple, or, as they are called, primitive or primary colors—*red*, *blue* and *yellow*. (See SPECTRUM, LIGHT, &c.) Compounded in various proportions, either in twos, or all three together, these three colors produce every hue in nature or in art, every tint that is physically possible. First, when combined in twos, they produce the three *secondary* colors—that is to say, blue and red make purple or violet; yellow and red, orange; blue and yellow, green. The grays and browns, again, are compounds of all three of the primary colors, in unequal and varying proportions.

COMPLEMENTARY COLORS are the colors or color which, with any color or colors

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mentioned, make up the three primary colors, which constitute white light. Thus, if the given C. be a primitive, its complementary C. is composed of the other two primitive colors, e. g., the complementary color of blue is orange—red and yellow. Again, if the given C. be a secondary, its complementary C. is the remaining primitive color. Thus, the complementary C. of green—blue and yellow—is red.

CONTRAST OF C. is either simple or compound. Each of the primitive colors forms a simple contrast to the other two. Thus, blue forms a simple contrast to red and to yellow. But if red and yellow be mixed together, the complementary C. to blue will be produced—viz., orange, which is the most powerful contrast that can be made to blue.

HARMONY OF C. consists in the preservation of the same character in a picture throughout, in so far as coloring is concerned. It is said to result from an equal distribution of the three primary colors, either pure or in composition; but such a rule, even if correct, is correct with so wide a latitude as scarcely to admit of practical application. The only method of attaining to a knowledge of harmony of C., is to train the eye by the observation of it as exhibited in nature. A southern sky will be found to harmonise with a southern landscape, and consequently, the colors of which the one is composed with those which compose the other. The experiment may be made by painting an Italian sky over an English landscape, when the want of harmony in the coloring will be at once apparent. The art of preserving harmony without sacrificing variety, resembles that of preserving light in shadow, and combining clearness with depth, which we have explained under CHIAR-OSCURO.

WARM AND COLD COLORS are terms derived from the corresponding sensations which they are supposed to produce. Blue is said to be a cold C., and orange a warm one, whereas red is neither warm nor cold. Without supposing color-blindness, however, it seems very possible to imagine that in this respect the same C. may, from association and other causes, produce different sensations on different persons.

A COLORIST is an artist in whose works success in color is the prominent excellence. The greatest colorists are Titian, Correggio, Paul Veronese, Rubens, and perhaps his pupil Vandyck. To say that these artists surpass Raphael, or even Leonardo da Vinci, in this respect, would probably be to say too much. But that they equal these greater artists in this, and in this respect alone, is a sufficient reason for their being known as colorists *par excellence*. The art of coloring admits of being transmitted to pupils to a greater extent than the highest branch of all.

COLOR, a rhetorical term, which was adopted into the technical language of English pleading. Previous to the passing of the Common Law Procedure Act of 1852 (15 and 16 Vict. c. 76), it was a rule that pleadings in confession and avoidance, as opposed to pleadings by way of traverse, should confess the matter adversely alleged, to the extent at least of admitting some apparent right in the opposite party requiring to be encountered and avoided by the allegation of new matter. This was called giving C. to the plaintiff's claim. All this curious subtlity, to which English lawyers till recently were in the habit of attaching so much value, was very properly set aside by the statute above referred to. This section which applies to C. is the 64th.

COLOR, in Heraldry. The colors used are generally red, blue, black, green, and purple; which are called Gules, Azure, Sable, Vert or Sinople, and Purpure. Tenne or tawny, and Sanguine or blood-color, sometimes occur, but they are not common. Yellow and white, again, are not colors in the heraldic sense, but metals; they are called Or and Argent, and are always represented by gold and silver. It is a fundamental and invariable rule in blazon, not to put C. upon C., or metal upon metal; thus, if the field be of a metal, the bearing must be of a C., and *vice versâ*. The only exception is said to be the arms of Jerusalem, which were given to Godfrey of Bouillon, which are *argent, a cross potence or, between four crosslets of the same*. Apparent exceptions to this rule in common blazon are—1. Abatements or marks of cadency or difference, labels, crescents, batons, and the like; and 2. Extremities or adjuncts to animals, or other objects, such as tongues, claws, horns, &c.: but neither of those are regarded as independent bearings. Colors and metals, when engraved, are generally indicated by dots and lines; *or*, gold, by dots; *argent*, silver, is left plain; *gules*, red, is indicated by perpendicular lines from top to bottom; *azure*, blue, by horizontal lines from side to side; *sable*, black, by horizontal and

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perpendicular lines crossing each other; *vert*, by diagonal lines from right to left; *purpure*, by diagonal lines from left to right; *tenne*, by diagonal lines from left to right, crossed by horizontal lines; and *sanguine*, by lines crossing diagonally from left to right, and from right to left.

CO'LOR-BLI'NDNESS, a term introduced by Sir David Brewster to denominate a defect of vision, owing to which certain persons are either unable to discern a single color, such as red, or to distinguish between two colors, such as green and red, so that they may be said to be blind to red, or to be blind to one of two colors presented simultaneously to the eye. This defect has been called *chromato-pseudopsis*—i. e., false vision of colors; Daltonism, after Dalton the chemist, who suffered under it; and various other learned names, have been applied to it; but C. seems to be as apt and expressive a name as any. It occurs in eyes whose power of vision, as to form and distance, is otherwise perfect. The late Dr George Wilson, whose work on this subject should be consulted by the reader ("Researches on Color-blindness," Edin. 1855), thus classifies the varieties of the defect: 1. Inability to discern any color properly so called, so that black and white—i. e., light and shade—are the only variations of tint perceived. 2. Inability to discriminate between the nicer shades of the more composite colors, such as browns, grays, and neutral tints. 3. Inability to distinguish between the primary colors, red, blue, and yellow, or between these and the secondary and tertiary colors, such as green, purple, orange, and brown. The first sort would appear to be very rare, but well-marked cases of it are on record, and shew that insensibility to colors is not only compatible with distinct vision in other respects, but is frequently attended by a greater power than is usual of perceiving objects very faintly illuminated. None of these recorded cases, however, have been examined with such care as to warrant the conclusion, that the C. was absolute. It would appear that where the C. is nearly absolute, degrees of luminosity supply the place of shades of color in giving variety to the aspects of objects. The second variety of C., where the nicer shades of the more composite colors are mistaken, would appear to be very common—the rule rather than the exception in the majority of persons, at least of the male sex, in this country; but this a matter of doubt how far it may not be referable to imperfect cultivation of the sense of color. In many cases of this kind, however, it can be shewn that the defect differs in degree only from that of the third form. The third form is the most important variety of the affection. In extreme cases, although colors are occasionally quite correctly named, there is no certainty as to any color: in less severe cases, two colors, at least, as red and green, and generally four, as red, green, olive, and brown, are not distinguished from each other. Yellow would appear to be the color which gives least difficulty to those not absolutely unconscious of color; while blue, if pure and well illuminated, is readily recognised by the color-blind, a few of whom, indeed, describe it as the color which they see best. Red appears to be the color the want of the sense of which may be said to characterise all the color-blind. Indeed, Dr Wilson thinks C. might properly enough be called *Anerythric* (no-red) vision. He says that while the normal eye analyses white light into three colored elements, one of which is *red* the color-blind eye, on the other hand, analyses white light into two elements, neither of which is red.

The eyes of persons having this defect of vision have been carefully examined after death without the discovery of any peculiarity. C. therefore has its seat in the sensorium, not in the visual apparatus.

C. would appear to be very prevalent. Of 1154 persons, of various professions, examined in 1852 and 1853 at Edinburgh by Dr. George Wilson, 65 or 1 in 17·7, were color-blind; 21 confounded red with green; 19 confounded brown with green; and 25 confounded blue with green. In consequence of this prevalence of the defect, the investigations into its nature are of the greatest practical importance. Railway officials, for instance, should always be tested for it, lest, being color-blind, they should mistake the various signals in use on lines of rail, and thus cause accidents.

Sir David Brewster, Sir John Herschel, Professor Maxwell, and many others, have written on the subject of color-blindness. Perhaps the most ingenious investigator of C., and the phenomena of vision generally, is Professor Maxwell, whose writings thereon in the Transactions of the Royal Societies of London and Edinburgh, will well repay perusal.

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COLORING, as a musical term, is applied to those passages and harmonic progressions in bravura airs affording the singer an opportunity of display. It is also applied to all grand harmonic combinations in orchestral compositions.

CO'LOR-PRI'NTING. See POLYCHROME PRINTING.

COLORS, The Diatonic Scale of. Sir Isaac Newton, when investigating the properties of light, discovered that the lengths of the spaces occupied in the Spectrum (q. v.) by the seven so-called primary C., exactly correspond to the lengths of chords that sound the seven notes in the diatonic scale of music. Hence the phrase, *the diatonic scale of colors.*

COLORS, Military, are certain kinds of flags carried with the army. Standards, banners, pennons, guidons, ensigns, colors—all are military flags, each originally having a distinct meaning, now to some extent departed from. The ensigns were the original of those which are now called C., and which especially belong to infantry regiments. The C. are square flags, larger than the standards carried by the cavalry. In former times, there was one for each company; but now there are generally two for a battalion, constituting a "pair of C.": one of which is called the royal or first, and the other the regimental or second. Both are about 6½ feet by 6, made of silk, with cords and tassels of crimson and gold, and fixed to a staff about 10 feet long. The royal color or flag is nearly alike for all the regiments; with a blue ground, an imperial crown, the number of the regiment, and the Union Cross of St George, St Andrew, and St Patrick. The regimental C. depends for its tint on the facings of the uniform of the regiment; in its centre is inscribed the number or designation of the regiment, with its crest and motto, if any; and around are the names of the victories and campaigns in which the corps has served. A subaltern officer carries the colors, and certain non-commissioned officers are set apart as a guard. The C. symbolize the good name and fame of the regiment, and are on that account protected in action with sedulous care; a victor always counts among his achievements the number of C. captured from the enemy. When a regiment obtains new C., they are usually solemnly presented by some lady of distinction. The presentation is made with much military pomp; and the chaplain of the regiment reads a prayer prepared for the occasion. A member of the Heralds' College is "inspector of regimental colors," the post being at present held by Garter-King-at-arms.

Besides the "pair of C.," there are small *camp* C., of the same tint as the facings of the regiment, to designate the part of the camp the corps occupies. Rifle regiments do not carry colors.

CO'LOR-SE'RGEANT, in the Army, is a non-commissioned officer of higher rank and better pay than the ordinary sergeants. There is one to each company of infantry, and the office is specially given to meritorious soldiers. The C. wears an honorary badge over the Chevrons (q. v.), and receives 2s. 5d. per day. He fulfils the ordinary regimental and company duties of sergeant, but in addition to these he attends the colors in the field, or in the front of a camp, or near headquarters in a garrison. A C. may be degraded to the rank of sergeant for misbehaviour, but only by the decision of a court-martial.

CO'LT'S-FOOT. See TUSSILAGO.

COLT'S REVO'LVER. See PISTOL, REVOLVER.

CO'LUBER, a genus of serpents which, as defined by Linnæus, included an extremely miscellaneous assemblage of species, venomous and not venomous, agreeing only in the character of having a double row of plates on the under side of the tail. The venomous species are now excluded, not only from the genus C., but from the family *Colubridæ*, of which it is the type. The serpents of this family are very numerous; it includes, indeed, about one-half of all the known serpents in the world. Their geographic distribution is very wide, although they chiefly abound in the tropics. Some of them are terrestrial, and some arboreal in their habits, the latter chiefly natives of the tropical parts of Asia and America. A few are inhabitants of fresh waters, and feed on fish. They are active in the pursuit of their prey, some of them feeding chiefly on small birds and quadrupeds, some on insects. They do not kill their prey by constriction, like the boas. Some of them are singularly and brilliantly colored. A few, particularly of the arboreal species, are remarkable

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for their extremely lengthened form. None of them grow to a very large size. To this family belong the common Ringed Snake (*Natrix torquata*) of England, the only British species. To the genus *C.* belong the Black Snake (q. v.) of America, and the Serpent of Æsculapius (*C. Esculapii*), figured by the ancients as an attribute of their god of medicine. It is of a brownish color, and attains the length of four or five feet. It is found in the centre and south of Europe, is easily tamed, and exhibits the greatest gentleness of manners.

COLU'GO. See FLYING LEMUR.

COLU'MBA, St. (called also St Colum-cille and St Colm), one of the greatest names in the early ecclesiastical history of the British Isles, was born (it is believed, at Garten, in the county of Donegal) in the north of Ireland, on the 7th of December, 521. His father, Fedhlimidh, of the powerful tribe of the Cinel Conaill, was a kinsman of more than one chief or prince then reigning in Ireland and in the west of Scotland; and his mother, Ethne, was also of royal descent. To this distinguished parentage, no doubt, he owed some measure of his great influence upon the minds of his countrymen.

He studied first at Moville, at the head of Strangford Lough, under St Finnian, by whom he was ordained a deacon; and afterwards under another St Finnian, at Clonard, where he was ordained a priest. Among his fellow disciples he is supposed to have had St Comgall, St Ciaran, and St Cainnech; and so conspicuous was his youthful devotion, even in that saintly company, that he received the name by which he is, perhaps, still best known in Ireland—"Colum-cille," or "Columba of the Church." In 546, when no more than twenty-five, he founded Derry, and, six or seven years afterwards, Durrow, the greatest of all his Irish monasteries. He seems now to have embroiled himself in the civil strifes of his country; and the belief that he instigated the bloody battle of Cooldrevny, in 561, led to his excommunication by an Irish ecclesiastical synod. The justice of the sentence was challenged by ecclesiastics of rank, but it was probably among the causes which determined him to leave Ireland.

It was in 563, when in his 42d year, that, accompanied by twelve disciples, he set sail for the little island of Hy or Iona, as it was then called—now better known as Iona (q. v.), or I Colum-cille—of which he obtained a grant, as well from the king of the Picts as from his kinsman the king of the Scots. Having planted a monastery here—built, it would seem, chiefly of wattles—he set himself to the great work of his life, the conversion of the Pictish tribes beyond the Grampians. The Picts dwelling to the south of that mountain barrier had been converted by St. Ninian of Whithern, in the 5th c.; and the Scots who peopled the western shores and islands of Scotland, were either Christians before they passed over from Ireland, or were afterwards converted by Irish missionaries. St C. now brought the Picts of the north to the true faith; but, unfortunately, very little is known of the way in which he accomplished his task. Bede speaks simply of his "preaching and example." Adamnan, extolling his gift of miracles, tells how the gates of the Pictish king's fort burst open at his approach, and how, as he chanted the 45th Psalm, his voice was preternaturally strengthened, so as to be heard like a thunder-peal above the din and clamor by which the Pictish magicians tried to silence his evening-prayer under the walls of the Pictish palace. We get another glimpse of his missionary footsteps from the "Book of Deer," a Celtic MS. of the 11th or 12th c., lately discovered at Cambridge. It records how "Colum-cille and Drostan, the son of Cosreg, his disciple, came from Hy, as God had shewn them, to Aberdour" (a beautiful little bay among the huge cliffs which fringe the coast of Buchan, as the north-east district of Aberdeenshire is still called); how "Bede, a Pict, was then high steward of Buchan, and gave them that town in freedom for evermore;" how "they came after that to another town, and it was pleasing to Colum-cille, for that it was full of God's grace; and he asked of the high-steward, Bede, that he would give it to him, but he gave it not; and, behold, a son of his took an illness, and he was all but dead, and the high-steward went to entreat the clerics that they would make prayer for his son, that health might come to him; and he gave in offering to them from Cloch-in-Tiprat to Cloch Pette-mic-Garnait; and they made the prayer, and health came to him." In some such way as this, St C. and his disciples seem to have traversed the Pictish mainland, the Western

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Islands, and the Orkneys, establishing humble monasteries, whose inmates ministered to the religious wants of the people. The parent-house of Iona exercised supremacy not only over all these monasteries, but over all the monasteries which St C. had built in Ireland, and over those which were founded by his disciples in the northern provinces of England when they converted the Angles and the Saxons. Thirty-four years appear to have been spent by St C. in raising up and perfecting his ecclesiastical system in Scotland. But the labor did not so wholly engross him, but that he found time for repeated voyages to Ireland, and for a visit to Glasgow, where St Kentigern or Mungo was restoring Christianity among the Welsh or British tribes of Cumbria and Strathclyde. The health of St C. seems to have begun to fail in 593, but his life was prolonged till he reached his 77th year, when he breathed his last as he knelt before the altar of his church in Iona, a little after midnight, between the 8th and 9th of June 597. He was buried within the precincts of his monastery, and his bones—which were afterwards enshrined—the stone pillow on which he slept, his books, his pastoral staff, and other things which he had loved or used, were long held in great veneration. No composition certainly known to be his has been preserved; but there have been attributed to him three Latin hymns of some merit, a short monastic (or rather heremitical) rule in Celtic, and several Celtic poems, among which is a collection of his prophecies.

The strength of St C.'s character appears to have been in its earnestness. There is no reason to think that he was reputed either wiser or more learned than the better class of the ecclesiastics of his age. But the same enthusiastic temper which won for him in boyhood the name of "Columba of the Church," continued to animate him throughout life. The length and frequency of his fasts and vigils are spoken of as nearly incredible. With this asceticism he combined unwearied industry; no hour passed without its allotted duty of prayer, or reading, or transcribing, or other work. As the prevailing austerity of his disposition was often lighted up by gleams of tenderness and kindness, so it appears to have been clouded at times by anger and revenge. "But whatever sort of person he was himself," wrote Bede, in allusion probably to these infirmities, "this we know of him for certain, that he left after him successors eminent for their strict continence, divine love, and exact discipline; men who follow, indeed, doubtful cycles in their computation of the great festival [i. e., Easter], because, in that far out of the world abode of theirs, none had ever communicated to them the synodal decrees relating to the paschal observance, but yet, withal, men diligently observing those works of piety and chastity, and those only, which they were able to learn from the writings of the prophets, evangelists and apostles."

The ecclesiastical system of St C. was in so far peculiar that, in the words of Bede, Iona "had always for its ruler a presbyter abbot, to whose jurisdiction both the entire province, and the bishops themselves also, contrary to the usual order of things, must own subjection, after the example of that first teacher of theirs, who was no bishop, but a presbyter and monk." The jurisdiction usually reserved to the episcopate was thus transferred to the abbatial office; little more being left to the bishop than the right of ordination, and a certain measure of precedence in the celebration of divine service. St C. himself, as well as his followers generally, till the year 716, kept Easter on a different day, and shaved their heads after another fashion, than obtained in other parts of Western Christendom. But, with these exceptions, their creed and rites appear to have been substantially the same.

The life of St C. was written by two of his successors in the abbacy of Iona—Cuimine Ailbe (657—669) and St Adamnan (679—704). The first of these lives is incorporated in the second, which is altogether one of the most valuable works now extant on the early ecclesiastical history of Scotland and Ireland. It has gone through many editions; the last, and incomparably the best—a book, indeed, beyond praise—being that of William Reeves, D.D., printed at Dublin in 1857 for the Bannatyne Club and the Irish Archæological and Celtic Society, and included in the series of "Historians of Scotland," published by Edmonston and Douglas. Besides his "Vita Sancti Columbæ," Adamnan wrote "De Locis Sanctis," an interesting account of Jerusalem and its neighborhood, from the information of a French bishop, who, in returning from the Holy Land, was driven among the Western Isles of Scotland. This tract has been more than once printed, and its chief passages were transcribed by Bede in his "Historia Ecclesiastica Gentis

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Anglorum." We learn from it that waxed tablets for writing were in use among the disciples of St C. in Iona, at the close of the 7th century.

CO'LUMBAN, or Columba'nus, St, one of the most learned and eloquent of the many missionaries whom Ireland sent forth to the continent during the Dark Ages, was born in Leinster about the year 545. Having studied under St Comgall, in the great monastery of Bangor, in Ulster, he passed over to France, in his 45th year, accompanied by twelve companions, and founded the monasteries of Annegray, Luxeuil, and Fontaine. His adherence to the Irish rule for calculating Easter involved him in controversy with the French bishops about 602; and a few years later, the courage with which he rebuked the vices of the Burgundian court, led to his expulsion from France. Passing through Switzerland into Lombardy, he founded, in 612, the famous monastery of Bobbio, in the Appennines, where he died on the 21st November 615. His life, written within a century after his death, by Jonas, one of his successors in the abbacy of Bobbio, has been repeatedly printed. The writings of St C., which are wholly in Latin, consist of a rule for the government of his monastery, a few poems, several letters on ecclesiastical affairs, and sixteen short sermons. His monastic rule has been printed more than once; but the most complete edition of his works is in Fleming's "Collectanea Sacra," published at Louvaine in 1667, and now of such rarity that a copy of it sells for about £35. Of the sermons of St C., M. Guizot remarks, that "the flights of imagination, the pious transports, the rigorous application of principles, the warfare declared against all vain or hypocritical compromise, give to the words of the preacher that passionate authority which may not always and surely reform the soul of his hearers, but which dominates over them, and, for some time at least, exercises paramount sway over their conduct and their life." The town of San Colombano, in Lombardy, takes its name from the Irish monk, as the town and canton of St Gall (q. v.), in Switzerland, perpetuate the name of the most favored of his disciples.

COLUMBA'RIUM (Lat.), a dove-cot or pigeon-house. When used in the singular, C. also signified a particular kind of sepulchral-chamber used by the Romans to receive the ashes of bodies which had been burned. The name was derived from the chamber being surrounded by small niches or holes resembling the holes in a dove-cot (Columbaria) in which the urns (*ollæ*) were deposited. Tombs of this description were chiefly used by great families for depositing the ashes of their slaves and dependants. Several of them are still to be seen at Rome. A very perfect one was discovered at the Villa Rufini, about two miles beyond the Porta Pia, in 1822. In each niche were two urns, with the names of the persons whose ashes they contained inscribed over them.

COLU'MBIA, the federal district of the United States, and the seat of the general government, lies on the left bank of the Potomac, being territorially within the limits of Maryland. The district contains about 60 square miles—its chief cities being Washington, the capital of the Union, and Georgetown. Pop. (1880) 177,624, of whom 119,549 were whites, and 58,075 colored. This territory was originally 100 square miles in area, but in 1846 the county of Alexandria was incorporated with Virginia, and C. was reduced to its present size. For a long time C. was less favorably situated than the territories in regard to parliamentary representation; but now, like them, it sends one delegate to Congress.

COLUMBIA, the capital of South Carolina, U. S., is situated on the east bank of the Congaree River, about 100 miles n.w. of Charleston. It is the terminus of the navigation of the Congaree, and of three railways that connect it with Charleston and the coast. Before the civil war it was one of the handsomest cities of the southern states, but it suffered largely during the conflict, having had its principal parts destroyed by fire. It is now fast recovering from the effects of that calamity. C. is the centre of a rich agricultural district, and has forests of pine, oak, walnut, and maple in its vicinity which produce a large quantity of timber. It has several educational and other institutions, including South Carolina University, founded in 1804. Population in 1880, 10,036 about a half of whom were colored.

COLUMBIA, a name long applied to the region to the west of the Rocky Mountains, comprehending the present state of Oregon, the territory of Washington, and British Columbia.

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COLUMBIA, or Oregon, the largest stream on the west side of America, rises in the Rocky Mountains, draining that range by means of its different head-waters, from about lat. 54° n. to about lat. 42° n. Its two main branches—the C. Proper from the north-north-east, and the Snake from the south-east—meet about lat. 46° 5′ n., long. 118° 55′ w., and united, run together to long. 124° 5′ w., where they empty themselves into the Pacific in a latitude corresponding with that in which they joined. This great river, long vaguely believed to exist, was discovered only in 1792, by Captain Gray of Boston in Massachusetts, who gave it the name of his own vessel in place of the floating appellations of the Oregon and the San Roque. The extreme length cannot be less than 1000 miles: most of its course—all, in fact, but the upper part of the north branch—being within the limits of the United States. Nevertheless, the entire navigation is equally open to the British and to the Americans. That navigation, however, is of comparatively little value, more particularly to the former nation. The river is broken by falls and rapids into many separate portions; and of these, even the lowest and most important, the maritime reach itself, does not exceed 90 miles in length. In addition to the inland impediments, the ingress and egress are embarrassed by a surf-beaten bar, which, with few and precarious passages, extends from Cape Disappointment on the north, to Point Adams on the south. Still, as a harbor, the C. has the recommendation of being decidedly the best on the coast between San Francisco, which is nearly 600 miles in the south, and Port Discovery, which is fully 150 miles to the north.

COLU'MBIA, British, since 1871 a province of the Dominion of Canada, is divided into two parts—the mainland, commonly called British C.; and Vancouver's Island (q. v.). These were formerly independent colonies, but were united in 1866. The total area of the province is estimated at 220,000 square miles. As Vancouver's Island is separately treated, the present article, as far as possible, will confine itself to an account of the mainland, which is situated in lat. 49°—55° n., long. 115°—132° w., and measures about 420 miles in breadth by 800 in length, its total area being estimated at upwards of 120,000 square miles. Its northern limit, as settled by act of parliament in 1858, follows the Simpson River to the Pacific Ocean on the west, and the Finlay, an affluent of the Peace, to the Rocky Mountains on the east. Running parallel with the chain on the east border, which itself rises, in Mount Brown, to a height of 16,000 feet, two ranges divide the width of the country into three sections of drainage. In the east are head-waters, which find opposite outlets in the estuaries of the Columbia and of the Mackenzie; through the entire middle and part of the east, the Fraser maintains a southerly course, till, at Fort Hope, it is bent sharply to the right by a mountain barrier, so as to enter the Gulf of Georgia barely within the international boundary;* and lastly, across the west, a series of streams, generally meeting long and narrow inlets of the ocean, and terminating in the Skeena, which, with its upland reservoir, Babine Lake, of 100 miles in length, is but little inferior to the Fraser itself. The principal harbors are Burrard Inlet, on the Gulf of Georgia, a few miles from new Westminster, and the chief port for the lumber trade; Howe Sound, north of Burrard Inlet; Bute Inlet, still farther north; Millbank Sound, which will become valuable as the gold mines on the Peace River attract a population; the river Skeena, now ascended by steam-vessels, and one of the routes to the Ominica gold mines; and the river Nass, near the frontier of Alaska, watering a region also believed to be rich in gold.

The interior of British C., i. e., the region between the Cascade Range and the Rocky Mountains, is, on the whole, rugged and lofty, and though rivers are numerous, they do not serve the purposes of irrigation, being often confined within deep ravines. Still the tracts of arable land are of considerable extent, and very fertile. In 1872, some land 1700 feet above the sea-level, yielded, under proper irrigation, 40 bushels of wheat per acre. The pastures of British C. are, however,

* The decision of the German emperor (21st Oct. 1872) on the "San Juan Boundary Question," has affirmed the accuracy of the American interpretation of the treaty of 1846, in virtue of which the boundary of the United States runs through the Haro Channel, and the San Juan archipelago, lying between Vancouver's Island and the mainland, and commanding the outlet to the Pacific, has been assigned to the latter power.

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likely to prove much more valuable than its arable ground. They are almost endless in extent. On the Cariboo road (between Soda Creek and Quesnel), there is a plain 150 miles long, and 60 or 80 wide; and between the Thompson and Fraser rivers there is an immense tract of grazing land. The hills and plains are covered with bunch grass, on which the cattle and horses live all winter, and its nutritive qualities are said to exceed the celebrated blue grass and clover of Virginia.

The forest lands are also of vast extent, and yield most valuable timber. The principal trees are the Douglas pine, Menzies fir, yellow fir, balsam hemlock, white pine, yellow pine, cedar, yellow cypress, arbor vitæ, yew, oak, white maple, arbutus, alder, dog-wood, aspen, cherry, willow, and cotton-wood. The Douglas pine is almost universal on the sea-coast and up to the Cascade range. The cedar, white pine, and maple are found everywhere; the Scotch fir, the willow, and cotton-wood on the bottom-lands. But the lumber-trade is only beginning; the value of the exports, in 1870, amounting to little more than £25,000. The Fraser River and its tributaries, with the numerous lakes communicating with them, furnish great facilities for the conveyance of timber. The Lower Fraser country especially is densely wooded. Smaller streams and the numerous inlets and arms of the sea do the same thing for the region further north.

The *fisheries* of British C. are perhaps the richest in the world, but their distance from populous centres has hitherto prevented their development. Whales and seals abound off the northern coasts. Sturgeon are plentiful in the rivers and estuaries; they are found weighing over 500 lbs., and are easily caught. The salmon of the Fraser River are famous over the American continent; so are the oulachans, small sprat-like fish, which enter the river in millions; some are so full of oil, that, it is said, they will burn like a candle. Cod, herring, halibut, anchovies, haddock, &c., are caught in great quantities.

Steamers now ascend the Frazer as far as Fort Yale, and others have been put on in various parts of the province, to provide easier access to the mining districts; but the inland routes are of the rudest description. Up the left of the Fraser, however, there is a tolerable road as far as Lytton at the confluence of the Thompson. The grand obstacle, however, in the way of all improvements, centres in the more attractive character of mining than of any more regular pursuit. Independently of silver, which has been discovered in the lower basin of the Fraser, and of copper, which is known to exist immediately to the east of the same, gold may be said to be universally diffused. In addition to the old "diggings," new mines were opened in 1871, in the north, in the Peace and Ominica district, and yielded in the same year over £30,000. The total yield for the province in 1875 was about £500,000, and the total yield from 1857 has been estimated at about £7,000,000. The only obstacles to the prosecution of almost inexhaustible gold-mining are the want of roads, the want of capital, and the want of a thorough geological survey. Silver mines have been opened in the Fraser Valley. Coal and iron are also found. Furs are one of the most important products of the country, the value of the exports of that article in 1874 being upwards of £60,000. The most valuable are the black and silver fox, sea otter, red fox, fur seal, mink, marten, beaver, and common otter. Buffalo are found on the plains; bears, and goats, and sheep on the mountains; elk are met with on the coast, and deer on the groups of small islands; wild ducks and geese are abundant; grouse and snipe are found everywhere; and in the plains a kind of tall buff crane, 4 or 5 feet high.

The *climate* varies according to the locality, owing principally to four causes: (1) greater or less distance from the sea; (2) or from the mountain regions; (3) difference in the variety and growth of vegetation; (4) difference of level. The low portions near the sea and on Vancouver's Island have a moderate climate, with a temperature ranging from 20° in winter to 80° in summer. The spring is short, lasting from the beginning of March to the early part of May. A short spring lasts from March till May; summer, from May till September; the next two months are autumn, of which winter is only an aggravation, the snows being light, and the frosts far from severe or lasting.

To its mineral resources, British C. mainly owes its present position. It was the discovery of gold in 1857—coinciding as it did with the expiration of the Hudson's Bay Company's licensed monopoly—that led to the establishment of the colony in 1858. In connection with this same cause, adventurers from the United States, from Great Britain and its dependencies, and from China, have flocked hither. Ac-

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cording to the census of 1871, the population of the province was 10,586, exclusive of Indians, who are estimated at from 30,000 to 50,000, but their numbers are diminishing from small-pox, measles, and tribal wars. When the Canadian Pacific Railway is completed, this province will become one of the most valuable in the Dominion. The different routes proposed have provoked much local contention; but the visit of Earl Dufferin, the governor-general, in 1876, has done good service in removing obstacles to this great enterprise.

British C. is represented in the Canadian parliament by 3 senators and 6 members of the House of Commons; but it has also a local legislature, a lieut.-governor, and an executive council. The chief towns are Victoria and New Westminster.

COLU'MBIDÆ, a family of birds, often comprehended under the general English names *dove* and *pigeon*, and forming the genus *Columba* (Lat. pigeon) of Linnæus. They are generally ranked among gallinaceous birds, but exhibit points of resemblance to the order *Insessores*, and have by some naturalists been constituted into a distinct order, intermediate between these. They agree with the true gallinaceous birds in the character of their bill, and in the soft naked tumid membrane at the base of it, in which the nostrils are pierced; also in their *rasorial* (scraping) habits and blunt claws; but they differ very widely from them in their great powers of flight, which are not surpassed in any other family of birds; in having the hind-toe on the same level with the other toes; in having no connecting membrane at the base of the toes; in not being polygamous but pairing, and in the male taking part with the female in the care of the young; in their having generally only two young ones at a time, but breeding often in a year; in their double crop, an expansion of the gullet on both sides, in which they differ from all other birds; and in the secretion, at breeding time, of a milky fluid by the crop of both parents, as in the parrots, with which the food is saturated in order to fit it for the young, which, unlike those of the true gallinaceous birds, are at first very helpless. The number of species of C. is very great. There is amongst them so much resemblance, that scientific classification has been found very difficult. They are found in all warm and temperate climates, but comparatively few are European. The Indian archipelago particularly abounds in them. Many of the tropical species exhibit a brilliancy of colors scarcely excelled in the humming-birds or sun-birds. The chaste beauty of the plumage is always pleasing, even when brilliancy is wanting. The voice is very similar in all the species, the *cooing* of some, however, being harsh, that of others soft and pleasant. Some species are migratory, and some congregate in prodigious flocks. See BRONZEWING, CARRIER PIGEON, DOVE, FRUIT PIGEON, GOURA, GROUND-DOVE, PARTRIDGE PIGEON, PASSENGER PIGEON, PIGEON, TURTLE-DOVE, and VINAGO.

CO'LUMBINE (*Aquilegia*) a genus of plants of the natural order *Ranunculaceæ*, having five colored sepals, which soon fall off, and five petals each terminating below in a horn-shaped spur or nectary. They are natives of the temperate and colder regions of the northern hemisphere. One, the common C. (*A. vulgaris*), is found in woods in some parts of Britain, and has long been familiar as an inmate of flower-gardens. It is a perennial, generally three or four feet high, with flowers of curious structure and considerable beauty. C. was formerly much esteemed for medicinal virtues, which are now seldom heard of.—Some of the other species are very ornamental, and are pretty common in flower-borders.

COLU'MBIUM, or Ta'ntalum (symbol Ta), is a rare metal found in the mineral tantalite, obtained from Bodenmais, in Bohemia, and from Sweden. It can be obtained as a black powder, which assumes a lustrous aspect when subjected to the process of burnishing. It forms a series of compounds, of which only Columbic Acid (TaO_3) is worthy of notice.

COLU'MBUS, Christopher (the Latinised form of the Italian *Colombo*, and the Spanish *Colon*), the great navigator who added a new hemisphere to our globe, is supposed to have been born at or near Genoa, in the year 1436, or, as others say, 1446. Though virtually the greatest man of his era, there is little definite information about his family and his early life. It would appear, however, that he was the son of a wool-comber; that he attended for some little time the then great school of learning in Pavia, where he evinced a taste for astronomy and cosmography; and

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that he early went to sea and made several voyages in the Mediterranean. Settling in Lisbon in 1740, he there married the daughter of an Italian named Palestrello, who had distinguished himself as a navigator in the Portuguese service, and with her obtained some valuable charts, journals, and memoranda. Lisbon, at this time, was the headquarters of all that was speculative and adventurous in the way of geographical discovery: and here, while constructing maps and charts for the livelihood of his family, C. first appears to have imbibed that idea of land to the westward, which he was destined, after long disheartening years, to establish as fact—the land, indeed, not being, as he had supposed it, a prolongation of the eastern shores of Asia, but a new western continent. With the view, apparently, of better qualifying himself for his great enterprise, C. made several voyages to the Azores, the Canaries, and the coast of Guinea—then the limit of European navigation in this direction. Not until about 1482 or 1483, did C. find opportunity to lay his scheme before John II. of Portugal. This monarch referred it to a junto of nautical and scientific men, who decided against it. The king, however, meanly taking advantage of a detailed plan obtained from C. under false pretences, secretly sent out a vessel to examine the route. Too timid to venture far from the beaten track, the pilots soon returned to Lisbon, to throw ridicule on the project. Disgusted with the duplicity of his sovereign, C. secretly left Lisbon in 1484, taking with him his little motherless boy Diego. He found his way to Genoa, where the republic, before whom he unfolded his scheme, treated it as the silly product of a visionary brain; and it is said that he also met with like treatment from the Venetians; but it appears doubtful whether he at this time communicated with them. Disappointed, but not despairing, for C. was buoyed up with the belief that Heaven had commissioned him to plant the banner of the cross upon those shores which as yet appeared to exist but in his own imagination, C. turned his steps toward Spain. Weary and hungry, he stopped one day at the gate of the Franciscan convent La Rabida, in Andalusia, to beg some bread and water for his child. This day was the turning-point in his career. The superior of the convent, Juan Perez de Marchena, passing at the moment, entered into conversation with the traveller, and was so struck with the grandeur of his views, that he used all his influence to procure him the favorable consideration of the king and queen. It was not, however, until seven more years of disappointments had passed over—during which C. had applied to other courts, and without avail—that he found himself in command of three small vessels, only one of which was decked, with 120 men, ready to start on his adventurous enterprise. C. claimed, as reward, to be nominated high-admiral, and governor-general and viceroy, over all the lands he discovered, with a tenth of the produce of the countries. On the 3d of August 1492, C. set sail from the bar of Saltes, near Palos. Delaying a month at the Canaries to refit, he started thence, on the 6th of September, over unknown seas. His crew soon began to interpose their timid fears, and when these were unavailing, to express their open disaffection; but equally disregardful of both, C. bore steadily westward; himself, however, not without misgiving as to what the variation in the needle (not before discovered) portended. On the 12th of October, his perseverance was rewarded with the sight of land, which proved to be one of the Bahama Islands. Here he solemnly planted the cross, giving the island the name of San Salvador. After discovering several other of the West India Islands, including Cuba and Hayti, or San Domingo, at the latter of which, called by him Hispaniola, he settled a small colony, C. set sail again for Spain, where he arrived on the 15th March 1493, and was received with every demonstration of joy and admiration, as well by the people as the court. In September of the same year, he set sail from Cadiz on a second expedition, with 17 ships and 1500 men. In this voyage, he discovered the Caribbee Islands, Jamaica, &c.; but calumnies at home forced him to return in 1496. Having cleared himself with his sovereigns, he, in 1498, set out on a third expedition. This time, steering more to the southward, he discovered Trinidad, and the mouths of the Orinoco, and landed at Paria, on the coast of South America. After these discoveries, C. steered for Hispaniola, where he found everything in disorder. The king's ear had been again abused; an officer, named Bovadilla had been appointed to supersede C. as governor, and by this person C. was sent home in chains. This unworthy treatment excited the indignation of the Spanish people to such a degree, that Ferdinand was fain to disavow all knowledge

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of the disgraceful affair. But all C.'s efforts to obtain redress from the king were fruitless. The spirit of adventure, however, which had borne him up amid so many disappointments, was not to be crushed by injustice. It still burned bright and strong as ever within the great old man, who, on the 9th of May, 1502, with four vessels and 150 men, set out once more to seek a passage uniting the Atlantic and Pacific oceans, which he imagined lay somewhere between Honduras and Paria. But the mutinous character of his crew forced him aside to seek for gold, and after many difficulties and disasters, and having added little of importance to his previous discoveries, he returned to Spain in November 1504. Isabella was dead; Ferdinand proved basely ungrateful; and so the noblest navigator the world has seen, was permitted to die in poverty at Valladolid, 20th May 1506. To make up somewhat for his injustice, Ferdinand gave C. a pompous funeral, and erected a magnificent monument to his memory, as if "Honor's voice" could

"Provoke the silent dust,
Or flattery soothe the dull cold ear of Death."

Biography furnishes no parallel to the life of C.; great men there have been who have met with disappointments and injustice, but there is perhaps no other instance of a great man whom disappointments and injustice did not dishearten and disgust; who had his greatness recognised in his lifetime, and yet was robbed of the emoluments it entitled him to; and who, after death, had the honor he had so hardly won conferred upon another. See AMERIGO VESPUCCI.

COLUME'LLA.—1. The central axis which remains, formed of the placentas, when the carpels of some fruits have separated from each other and from them.—2. The central axis of the spore-cases (capsules) of mosses.—3. The central axis around which the whorls of many spiral univalve shells are closely wound.

COLUMELLA, Lucius Junius Moderatus, the most learned of Roman writers on practical agriculture, was born at Cadiz, in Spain, and flourished in the earlier part of the 1st c. of the Christian era. For some time, he resided in Syria, but lived chiefly at Rome, and died, most probably, at Tarentum. His great work, "De Re Rustica," in 12 books—the 10th, On Gardening, is versified—is addressed to one Publius Silvinus, and treats of arable and pasture lands, culture of vines, olives, &c., care of domestic animals, &c., respective duties of masters and servants, &c. A supplementary treatise relates to trees. This ancient "Book of the Farm" is written in good Latin, and the information is copious, though not precise, and in some points of questionable accuracy. The best editions of C. are by Gesner (1735 and 1773) and Schneider (1794—1797).

CO'LUMN (Lat *columna*), a pillar or post, usually cylindrical in form, employed for the purpose of supporting a roof, entablature, or other superstructure. As the earliest habitations in almost all countries were formed of wood, it is unquestionable that the earliest columns consisted of the trunks of trees. It is said that even at the present day the Greek peasants of Asia Minor construct their wood-huts so as almost exactly to resemble the form and disposition of parts which we find in the great architectural monuments of classical antiquity. That the Greeks actually made use of wood in the earliest time, even for their monumental structures, we learn on the testimony of Pausanias, who mentions a monument in the market-place at Elis which consisted of a roof supported by pillars of oak; and Pliny tells us that the temple of Juno at Metapontum was supported by pillars made of the stems of vines. From these facts, it is natural to conclude that the stone columns which came first into use would be imitations of the trunks of trees; and this we are also in a condition to prove historically, many of the largest stone columns in Egypt—where, from the scarcity of wood, they were earlier introduced than elsewhere—being manifest imitations of the trunk of the palm. In order to prevent them from being forced into the ground by the superincumbent weight, these early wooden columns were placed upon one or more large flat stones, and on the top another stone was placed, to preserve them from the decay which the rain sinking into the wood would have occasioned. In these primitive arrangements we plainly perceive the germ of the three principal parts of the classical C.—the shaft, the base, and the capital. As the Doric style of architecture was the earliest of the classical styles, the Doric is naturally the simplest and most

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severe of the classical columns. One of its most striking peculiarities is what at first sight seems to be the absence of the base. The true account of the matter, however, is that all the columns in the same line of a Doric temple stand on one base, whereas in the other orders each C. has a separate base. But it is in the capitals in all the orders, Egyptian, Classical and Gothic, that columns differ from each other most strikingly. As classical architecture advanced, greater lightness and elegance were sought after; and this, as regarded the C., was obtained by increasthe height and diminishing the proportional thickness of the shaft. In the Ionic and Corinthian orders as compared with the Doric, this peculiarity may be distinctly seen.

In almost all columns, the shaft tapers gradually from the bottom to the top, thus imitating the natural growth of a tree, and at the same time conforming to a mechanical rule for obtaining the greatest amount of strength in upright bodies. But in place of tapering regularly, the shaft was generally made with a slight swelling towards the middle, called the *entasis*, and had for the most part in all the classical orders striped incisions from top to bottom called flutes or channels, which were regularly worked, and varied in number from 20 to 32. See Fluting. The relation which subsisted between the height of the C., and the diameter at the top and bottom, and between these and the entablature, has been calculated with the greatest possible precision in all the principal classical examples, and will be found stated in all professional works on classical architecture. The shaft usually consisted of several cylindrical blocks accurately fitted to one another, whilst the capital was commonly hewn out of a single stone. The separate portions of the shaft were fixed together, not by mortar or cement, but by iron cramps, which were fitted into holes in the centre, and thus rendered invisible. Sometimes columns of immense size were hewn in the quarry of one piece of stone, and then rolled over the ground, and raised to their destined positions by various mechanical contrivances. Columns were often used in classical times, and are employed by us in the interior of buildings to support the roof or galleries, as well as for purposes of decoration; and this custom seems to have prevailed in the halls of persons of great distinction even in Homeric times. In the ancient Basilica(q.v.),a line of columns separated the central space which was open to the sky from the aisles of the building, whilst at the same time they supported the galleries which were placed above the aisles. These columns were the origin of the piers or pillars by which the nave is divided from the aisles in Christian churches. The same arrangement prevailed in the Roman atrium. When, in order to support the roof which covered the gallery or any other superstructure, a second row of columns was introduced, it was usually of the lighter styles, Ionic or Corinthian, the lower columns being commonly Doric. Single columns were erected for various purposes, as for mooring ships in harbors, or to commemorate persons of note or national events. See Pillar.

Capitals.—In classical architecture, it is by the capitals of pillars, more than by any other feature, that the different orders are distinguished, very much as the Gothic styles are marked by the form of the arch. Till the period of the renaissance, the head of a column, in English, was called chapiter (chapter), its diminutive being chapitrell. The three capitals which alone belong to pure Greek architecture are described in Thomson's well known lines ("Liberty?"), so concisely and accurately, that it is needless to dwell on them in prose:

> "First unadorned,
> And nobly plain, the manly Doric rose;
> The Ionic then, with decent matron grace,
> Her airy pillar heaved; luxuriant last,
> The rich Corinthian spread her wanton wreath."

To the three Greek orders, the Romans added two others: the Tuscan, which was a variation on the Doric, or rather a corruption of it; and the Composite, which was a combination of the Ionic and Corinthian, the proportions and general character of the Corinthian being retained, but the Ionic volutes being substituted for the Corinthian leafage. As the trunks of trees placed upright, so as to support the roof, unquestionably led to the introduction of the stone pillar, there seems to be almost as little doubt that the capital was suggested by the boughs with which such trees might be supposed to be surmounted, or the garlands with which,

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on festive occasions, they were probably encircled and crowned. At first, when the power of working in stone was limited, imitation of foliage was scarcely attempted; but the original idea being adhered to, it came at last to be carried out with great success in the Ionic and Corinthian capitals of classical architecture, and in all of the more advanced of the Gothic styles.

The forms of Gothic capitals are so various, that it is altogether impossible to particularise them here. Beginning with the Romanic—which is often nothing more than a modification of the Doric, or a further debasement of the Tuscan, the sides being truncated or flattened, and some of the mouldings omitted—they advance very rapidly in adornment; and in the style which we call Early English, they already frequently consist of a mass of foliage, cut with great boldness and freedom, so that the stalks and more prominent of the leafage are entirely detached. It is remarkable that, in the decorated style, the capital lost much of the richness which it possessed in the earlier styles, and often consists only of plain mouldings, with or without a ball-flower (q. v.), cut on the bell or bowl of the capital. Where foliation is introduced in this style, it is usually worked with greater freedom, and is free from the stiffness which characterises earlier work. Animals, figures in armor, heads of bishops in mitres, and the like, are oftener found in the decorated style, though their introduction was not unknown at a much earlier period. In the perpendicular style, the capitals were stiffer in form, and generally less ornamented than in any of the others; though even here foliage is often introduced.

The only invariable characteristics of capitals seem to be something like a moulding at the upper part of the shaft, more or less complicated according to circumstances, and some sort of Abacus (q. v.) or flat portion on the top, on which the architrave rested in the classical orders. These characters belong even to the Egyptian capitals, which in many other respects resemble those of the other styles. The foliation of Egyptian capitals is generally taken from the vegetation peculiar to the banks of the Nile; but the capitals of this, particularly in its later examples, were infinitely varied both in decoration and in form.

COLUMN, in Military Evolutions, is a mass of soldiers several ranks in depth, presenting a formation different from that which arises from spreading them out in *line*. There may be columns of brigades, of regiments, of battalions, or of companies; presenting a front of limited width, but a depth depending on the number of elements in the column. If a battalion consists of ten companies, then a "battalion in C." has all the companies posted one behind another. According to the density of the C., it is called *open* or *close*. In a battalion, when the distance between any one company and the one immediately before it is such as to admit of their wheeling into line, the formation is called *open* C.; when the distance between the front rank of one company and the rear rank of the one before it is only a few yards, it is *close* C.; when intermediate between these two, it is *half-distance* column. The relative advantages of C. and *line*, in drawing up troops for action, are among the matters closely studied by the commanders of armies: the French, as a general rule, have rather favored the formation in C.; the English, that in line. Sometimes the name C. is given to that which, in effect, is a small army.

CO'LURE. See ARMILLARY SPHERE.

COLU'TÉA. See SENNA.

COLY'MBIDÆ, a family of web-footed birds, distinguished by short wings, legs placed so far back that the bird always assumes an erect position when standing, broad flat tarsi (*shanks*), and a compressed bill, pointed at the tip. They are all extremely aquatic in their habits, and possess great powers of diving as well as of swimming. Some of them have all the front toes perfectly webbed, as the loons or divers (*Colymbus*); others have the feet lobed, each toe with a separate membrane, as the grebes (*Podiceps*). These are the two principal genera. The guillemots (*Uria*) seem to connect this family with the *Alcadæ*.

CO'LZA. See RAPE.

CO'MA, a Greek word used in medicine, to signify a state of more or less profound insensibility allied to sleep, but differing from natural sleep in its characters, as well as in the circumstances under which it occurs. In C., the patient lies on his back, and is either simply insensible to external impressions, or has a confused and

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dull perception of them, with restlessness and low Delirium (q. v.). The former kind of C. occurs in apoplexy and epilepsy, and also in many other organic diseases of the brain and its membranes, of which, indeed, it may be said to be the natural termination. It is also seen in narcotic poisoning, and most characteristically in poisoning by Opium (q. v.). In the most fatal forms, the breathing is very slow and noisy (snoring or stertorous), accompanied with puffing of the cheeks; the pulse is at first strong and regular, afterwards feeble; there is often lividity; and the pupils are either contracted or excessively dilated, but in either case immovable, and totally insensible to light. In the second variety of C. there is perpetual restless delirium, without enough of sensibility to lead to spontaneous and regular voluntary movements; the patient mutters slightly, and [illegible]s feebly and without purpose at any object in his way; the pupils are commo[illegible]ntracted, and the tongue is apt to be dry and brown. This kind of C. is mainly seen in many fevers, and forms one of the modes of their fatal termination. The treatment of C. is that of the disease or accident leading to it. Where there is a reasonable chance of recovery, the patient must be roused to consciousness as much as possible, either by frequent movements or strong impressions on the skin, or by the use of galvanism, so as to maintain the respiration. See OPIUM. Blistering of the head is also sometimes resorted to with good effect.

CO'MA BERENI'CES (Lat. Berenice's hair), a small and close cluster of stars near the equinoctial colure, south of the tail of the Great Bear.

COMMA'CCHIO, a fortified town of Central Italy, in the province of Ferrara, and 3 miles from the Adriatic. The lagoon or marsh, in the midst of which it is situated, is about 140 miles in circumference, and is shut out from the Adriatic by a narrow belt of mud. Its position is very favorable for the manufacture of salt, of which 2,000,000 lbs. are said to be obtained annually. C. is also the seat of a curious branch of industry—viz., eel culture, which forms the principal employment of its inhabitants, who number about 8000. A series of canals have been constructed leading from the Adriatic to admit the fry of the eel, the mullet, the sole, and other fishes into the lagoon, where they are fattened, and speedily attain a marketable value. The fishery is carried on chiefly in the late autumn, when the waters of the lagoon are excited by storms. The fish, then seeking an outlet to the sea, find their way into certain labyrinths leading into reservoirs constructed at the termination of the canals, where they are caught in immense quantities. Religious ceremonies inaugurate the commencement of the season, and when any body of fishermen in one night capture 48,000 lbs. weight of fish, a feast of fish is held, and great rejoicings take place. The eel-harvest occupies from twelve to fifteen weeks; and some idea of its extent may be formed from the fact, that from the year 1798 to 1818 the annual "take" averaged close upon 2,000,000 lbs. weight. From 1818 to 1825, the average was about 1,612,600 lbs. per annum. An accident for some years greatly reduced these quantities, but the supply is again increasing, being upwards of a million pounds weight per annum. The fish are prepared for the market by partial cooking in a large kitchen built for the purpose, the eels of moderate size being roasted alive, in order to their better preservation. The larger fish are chopped into lengths, the heads and tails being sold for the benefit of the poor. Large quantities of the eels are also salted and dried. The workmen, who are lodged in barracks, and submit to a strict discipline, are allowed one and a half pounds of fish per diem. The money-value of these fisheries may be estimated from the fact, that 1 lb. weight of eel-fry will, in the course of three or four years, be worth to the cultivators of the lagoon a sum of £41 sterling.

COMAYA'GUA (formerly VALLADOLID LA NUEVA), chief city of Honduras, Central America, 190 miles east of Guatemala, in a fine but unhealthy valley, 1600 feet above the sea, on the right bank of the Humuya, which flows into the Pacific. The city was founded in 1540, is the see of a bishop, has a cathedral, college, ecclesiastical seminary, several convents, and a rich hospital. Pop. 8000; it was 18,000 previous to 1827, when the city was burned by the monarchical faction of Guatemala, and has never since wholly recovered.

COMB (Sax. *camb*). Combs seem to have been used by the ancients rather for adjusting than for fastening the hair, the pin or bodkin (*acus*) having been chiefly employed for the latter purpose. Both the Greek and Roman combs were generally

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made of boxwood, which was obtained from the shores of the Euxine; but latterly, ivory combs came into general use amongst the Romans, as they had long before been amongst the Egyptians. The precious metals were also used for the purpose, as we may infer from the golden combs ascribed to the goddesses; but this was probably rarer in ancient than in modern and medieval times, from the circumstance of the C. not having been then used as an ornamental fastening. Of the early use of gold combs by our own countrywomen, we have a monument in the well-known ballad of "Sir Patrick Spens:"

> "O lang, lang may their ladyes sit,
> Wi' their gowd kaes in their hair."

An ancient Irish long rack C. is in the museum of the Royal Irish Academy. The sides are hog-backed, and between stem are set the pectinated portions, varying in breadth from half an inch to an inch and a quarter, according to the size of the bone out of which they were cut. The whole is fastened together with brass pins riveted. By this contrivance, any damaged portion could easily be replaced.

Combs are made of tortoise-shell, ivory, horn, wood, bone, metal, and india rubber. The material is first made into plates of the size, shape and thickness of the C., and then the teeth are cut. The old method of cutting the teeth is by the *stadda* or double saw, which has two blades of steel set parallel to each other, with a space between them equal to the thickness of the intended tooth. Combs with 50 or 60 teeth to the inch may be cut in this manner. The teeth are then thinned, smoothed, and finished by means of thin wedge shaped files. Instead of hand-saws, circular-saws of similar construction have been more recently used.

Many combs are now made by a method called "parting." By the processes of cutting above described, the material corresponding to the spaces between the teeth is of course wasted; by the method of parting, this is made available to form the teeth of a second comb. The plate of horn, tortoise-shell, &c., is cut through by means of a stamping-cutter, consisting of two thin chisels inclined to each other; between these, and connecting the ends, is a small cross-chisel. When this compound cutter descends with sufficient force upon the plate, it will cut one of the teeth. By simple machinery, the table carrying the plate is made to advance a distance equal to the thickness of one tooth while the cutter is rising, and thus the successive cuts are made. A slight pull is now sufficient to part the plate into two combs, the teeth of which only require filing and finishing.

India-rubber combs, now so extensively used, are manufactured by pressing the caoutchouc to the required form in moulds, and "vulcanising" or combining it with sulphur afterwards. By this means a high degree of hardness can be obtained.

COMB, or Coomb, an old corn-measure, containing four bushels. In many localities, hollows or valleys among hills are called Combs or Coombs (W. *cwm*). The word is allied to the Gr. *kymbos*, a cavity; *kymbe*, a vessel.

COMBE, George, a well-known phrenologist and moral philosopher, was born October 21, 1788, in Edinburgh, where he was educated. Entering the legal profession, he became a writer to the Signet in 1812, and continued to practise until 1837, when he resolved to devote himself to scientific pursuits, for which he had always manifested a predilection. As early as 1816, he made the acquaintance of Dr. Spurzheim, while the latter was on a visit to Scotland, but at first regarded his phrenological system with aversion. Investigation, however, convinced him that phrenology was based on fact. The result was his "Essays on Phrenology" (1819). Five years later, appeared his "System of Phrenology," which became very popular, and reached a fifth edition in 1843; besides being reprinted in America, and translated into French and German. But his most important production is "The Constitution of Man considered in Relation to External Objects" (1828; 9th ed. 1860). This work endeavors to demonstrate, what it is strange should ever have been denied, the essential harmony of the nature of man with the surrounding world, and the necessity of studying the laws of nature, in order that we may realise the advantages of the external world, lessen our exposure to outward evils, and carry out successfully man's physical, moral, and social improvement. C.'s doctrines were violently opposed, being considered by many as inimical to revealed religion; but now that the heat of controversy has cooled, it is seen that, in

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their main aspects, they were not liable to the objections urged; and they are, to a large extent, adopted in the physico-social reforms of the present day. Nearly 100,000 copies of the work have been sold in this country; numerous editions have been printed also in America, and it has been translated into French, German, and Swedish. C. contributed largely to the "Phrenological Journal" (20 vols., 1824—1847). He travelled in Germany and America, and published "Notes" of his experiences. His death occurred on 14th August 1858. Mr. C. married, in 1833, Cecilia, daughter of the celebrated Mrs Siddons; by whom he was survived. Besides the works mentioned, he wrote "Elements of Phrenology" (1824; 9th ed. 1862); "Lectures on Popular Education" (1833; 3d ed. 1848); "Moral Philosophy" (1840; 3d ed. 1846); "Life and Correspondence of Andrew Combe, M. D." (1850); "Principles of Criminal Legislation and Prison Discipline" (1854); "Phrenology applied to Painting and Sculpture" (1855); and "The Currency Question considered in Relation to the Bank Restriction Act, 7 and 8 Vict. c. 32" (1855; 8th ed. 1858), &c. The latest of his works—in which the importance of natural religion, and the duty and advantage of obedience to its precepts, are eloquently enforced—is on "The Relation between Science and Religion" (1857). Endowed with great activity and an earnest apostolic spirit, C. was fond of lecturing on his favorite subjects, and delivered many successful courses not only in various parts of the United Kingdom, but in the United States, and even in Germany. As a citizen, he took a zealous part in promoting parliamentary reform, the abolition of the corn laws, and a system of national education available to every sect on equal terms. His collection of books on phrenology has been deposited in the Advocates' Library in Edinburgh.

COMBE, Andrew, M.D., brother of the preceding, was born in Edinburgh, October 27, 1797. He studied medicine there and at Paris, and in 1823 commenced to practise in his native city. In 1836 he received the appointment of physician in ordinary to the king of the Belgians, but his delicate health prevented him from retaining this office; and on returning to Brussels, he continued to act only as consulting-physician to his majesty. Afterwards, he became one of the physicians in ordinary to Queen Victoria in Scotland. He died at Edinburgh, August 9, 1847. His principal works are—"Observations on Mental Derangement" (1831); "The Principles of Physiology applied to the Preservation of Health," &c. (1834; 15th ed. 1860); "The Physiology of Digestion considered with Relation to the Principles of Dietetics" (1836; 10th ed. 1860); and "The Management of Infancy, Physiological and Moral" (1840; 9th ed. 1860, revised by Sir James Clark; 10th ed. 1870). Mild, benevolent, and wise, Andrew C. obtained the esteem and admiration of all who could appreciate purity and excellence of character. In his "Life and Correspondence," published by George Combe in 1850, we find not only a vivid picture of the man, but an example of patient adherence to physiological principles in the treatment of a delicate constitution, with the result of prolonging a useful life far beyond what he had ventured to hope for. The record of the means by which he combated a serious pulmonary disease for nearly thirty years at home and abroad, is calculated to be highly instructive to persons similarly afflicted. His death was probably hastened by exposure to the poisonous air of an emigrant ship, in which he made a voyage to America: the experience gained on this occasion led him to proclaim, through the "Times," the urgent necessity of a law regulating the sanitary arrangements in emigrant vessels. The long letter which he wrote on this subject appeared on September 17, 1847, a month after his death, and ere long the Act 12 and 13 Vict. c. 28, provided a remedy for the evil. Dr C. also exerted himself successfully for the improvement of medical education. A list of his contributions to the "Phrenological Journal" and the "British and Foreign Medical Review" is appended to his "Life." His character as a man, a physician, and a writer, is affectionately depicted by his friend Sir James Clark, in an Introduction to the 9th edition of "The Management of Infancy."

COMBERMERE, Viscount (Stapleton Stapleton-Cotton), a British field marshal, son of Sir Robert Salusbury Cotton, baronet, of Combermere Abbey, Cheshire, was born in 1773 at Llewenny Hall, Denbighshire. Educated at Westminster School, he in February 1790 entered the army, and distinguished himself in India at the battle of Mallavelly and the siege of Seringapatam. In 1807—in which year he suc-

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ceeded his father in the baronetcy—he proceeded, with the rank of major-general, to the Peninsula, in command of a brigade of cavalry, and in 1810 was appointed to the command of the whole allied cavalry under the Duke of Wellington. He was present at the battles of Talavera, Fuentes de Onore, Salamanca—where he was second in command and was severely wounded—the Pyrenees, Orthes, and Toulouse. For his brilliant services in the Peninsular War he repeatedly received the thanks of parliament, and in May 17, 1814, was raised to the peerage as Baron Combermere. Although not at Waterloo, he had command of the cavalry of the army of occupation in France, and in 1817 was appointed governor of Barbadoes and commander of the forces in the West Indies. In 1822 he became commander-in-chief in Ireland, and in 1825 was nominated commander of the forces in India. In that position he achieved the capture of the strong and almost impregnable fortress of Bhurtpore, and December 2, 1826, was raised to the rank of viscount. In 1834 he was sworn a privy councillor, and in October 1852 succeeded the Duke of Wellington as Constable of the Tower of London and Lord-lieutenant of the Tower Hamlets. In 1855 he was made field marshal. He died in 1865.

COMBINATION means the act of uniting or combining certain active elements; and it has come lately, in the legal and political phraseology of England, to mean the uniting together of persons having a common interest, with a view to promoting that interest. Thus, it may refer to employers uniting together to keep up prices or keep down wages; or it may apply to workmen uniting together to keep up wages. The word is now almost exclusively used in relation to the proceedings of the working classes for retaining the monopoly of certain occupations, or for keeping up wages above their natural amount. C. is one of the most obvious, and, in certain circumstances, one of the most justifiable and beneficial arrangements. Like all other human institutions, it has its good and bad shape—the former, when it is used for protection; the latter, when it is used for oppression. It is a practical exemplification of the precept taught by the old man in the fable, when he recommended union to his sons by shewing that the bundle of sticks could not be broken, but that each stick could be easily snapped when separated. The municipal corporations were combinations to protect the citizens against the power of the aristocracy, and a group of these municipal corporations formed themselves into a larger C., well known as the Hanse Towns, whose united influence not only braved the aristocracy, but exceeded that of many of the European monarchies. The guilds and other societies, whether of merchants or artisans, were combinations established for protection in violent times; though they were employed to further monopoly and interfere with freedom of trade, when more equal laws, and a higher social civilization, rendered them unnecessary for mere protection from external oppression. The free-masons are a relic of a great guild, or secret society, pervading all Europe. The similarity to each other of contemporary Gothic buildings, however far apart, is explained by the circumstance that they were built by a large C. of workmen, who all learned in the same school the same rules of art, and who had secret arrangements which enabled them to work together, and preserve the monopoly of the building trade.

The oppressive laws to which the working-classes, even in this country, were subjected, fully justified them in combining for their own protection. The nature of those laws is explained, though not justified, by the fact, that they were less oppressive than the institutions of other countries where the working-classes were in actual serfdom; and that they mark, in reality, the steps of progress onwards from the state of slavery or serfdom in which all the working-classes were of old involved, even in this country. The boasted freedom of our Saxon ancestors was, indeed, very similar to that of the southern states of North America before the late civil war, since it was all enjoyed by the upper class, to whom the inferior persons were slaves; and the term freeman, still used in certain municipalities, of old distinguished those who were not slaves. The statutes of labor still retained a portion of this servitude, laying heavy penalties on workers in the various trades who refused to work at a regular fixed remuneration—often, of course, below the market value, otherwise it would not require to be protected by penalties. By the Poor Law Act, too, those who would not work might be veritably enslaved by being compelled to labor in the service of any householder. It may be said, indeed, to be the last stage of the emancipation of the working classes from slavery when the C. Act

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was repealed in 1825. This act, which, after all, was a mild relic of the old laws for coercing workmen, subjected those who, whether verbally or in writing, entered into combinations for keeping up the wages of their labor, or limiting the hours of work, to be punished by imprisonment as criminals. There is no doubt that, in defiance of this act, secret combinations were held of a more dangerous and cruel character than any which have occurred since the repealing act of 1825, which rendered C. itself lawful, but punished any attempts to enforce the views of the combining workmen by violence or intimidation.

Both by the law of the land, and the public opinion on which it rests, it is now allowable for any class of men to combine together for the purpose of fixing the price at which they shall buy or at which they shall sell, provided their C. be entirely voluntary, and subject no one to coercion. All the landlords of a state for instance, might combine to keep up the price of grain; but if they should get a law to enable them to exact this price by prohibiting any of their body from selling for less, or for prohibiting or limiting the importation of foreign grain, then their C. would be oppressive. In like manner, a hundred bricklayers or a hundred tailors may combine not to work for less than a certain remuneration, or not to work more than a certain number of hours daily; and they are quite free to do so, provided they do not compel any one to join their C., or do not interfere with those who are content to work on lower terms. The difficulty is to define compulsion.

Royal Commissioners appointed to inquire into the subject of trade-unions and combinations of workmen in 1869 and 1875, gave an account of the history and working of the modern law, and its modifications from time to time. In 1871, two acts were passed for the purpose of consolidating and settling the law; these were supplemented by the Trades-union Act Amendment Act, 1876, which more fully defines the nature of the combinations to which the acts apply, the rights of members in certain events, and impo-es conditions in reference to registration. 34 and 35 Vict. c. 31, defined what trade-unions were to be deemed unlawful, and when their contracts were not enforceable, and provided for the legislation of trade-unions, and the protection of their property. The other act 34 and 35 Vict. c. 32, repealed all the former laws as to violence, threats, and molestation; but it has now been repealed by the Conspiracy and Protection of Property Act, 1875, 38 and 39 Vict. c 86, which applies to the United Kingdom. The leading characteristic of this act was to abolish, as much as possible, the appearance of exceptional legislation as to the mutual relations of workmen and their trade-unions, and to make general rules applicable to all businesses and occupations. It was declared that an agreement or combination by two or more persons to do, or procure to be done, any act in contemplation or furtherance of a trade dispute between employers and workmen, shall not be indictable as a conspiracy, if such act committed by one person would not be punishable as a crime. Before that statute, what was innocent when done by one person became indictable when done by three or more simultaneously.

The law relating to compulsion or intimidation is now generalized as follows: Every person who, with a view to compel any other person to abstain from doing or to do any act which such other person has a legal right to do or abstain from doing, wrongfully and without legal authority (1) uses violence to, or intimidates such other person, or his wife or children, or injures his property; or (2) persistently follows such other person about from place to place; or (3) hides any tools, clothes, or other property owned or used by such other person, or deprives him of, or hinders him in the use thereof; or (4) watches or besets the house or other place where such other person resides or works, or carries on business, or happens to be on the approach to such house or place; or (5) follows such other person with two or more other persons in a disorderly manner, in or through any street or road—may either be indicted or punished summarily by justices of the peace, and fined £20, or imprisoned for three months with hard labor. But any person charged before justices is entitled to object to their jurisdiction, and claim a trial before a jury. If he is convicted by justices, he may appeal to Quarter Sessions. In Scotland, the offence can only be prosecuted by the procurator-fiscal or Lord-Advocate in the Sheriff Court or Court of Justiciary. Though breaches of contract by workmen are not now punished criminally, they are so in case of gas and water supply.

COMBINATION, Laws of, in Chemistry. See ATOMIC THEORY.

COMBINATIONS, in Mathematics. See PERMUTATIONS.

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COMBING, of wool, cotton, &c. See CARDING.

COMBRETA'CEÆ, a natural order of exogenous plants, consisting of trees and shrubs, all natives of tropical countries. It contains about 200 known species, most of which are characterised by astringency.

COMBU'STION is the term applied to the process of burning, which usually consists in the oxygen of the air uniting with the constituents of the combustible substance. Thus, the C. of coal is due to the oxygen of the air passing into a state of chemical union with the carbon and the hydrogen of the coal, forming carbonic acid (CO_2) and water-vapor (HO). Such chemical combinations are always accompanied by the production of more or less heat, as in the case of decaying wood and other vegetable matter; but it is only when the action is so rapid as to evolve intense heat accompanied by light, that the process is called burning or combustion. Though the gaseous oxygen has as much to do with the process as the more solid material, coal, wood, paper, or cloth, yet the latter is alone styled the *combustible*, or *burning body*, whilst the oxygen is invariably named the *supporter* of combustion. A few substances burn at ordinary temperatures, such as phosphorus, which glows when exposed to the air; but the generality of substances, such as wood, coal, &c., require to be raised in temperature or be set fire to before they possess the power of combining with the oxygen of the air. The amount of heat given out by the various combustibles when burned, is capable of being measured, and is definite. The same weight of the same combustible invariably evolves the same amount of heat during its complete C.; but different combustible substances give off different amounts of heat. The mode in which the heat evolved may be measured, is either (1.) To observe the quantity of ice which a given weight of the combustible will melt when burning; (2.) To notice the weight of water which the combustible will convert into steam; or (3.) To estimate the number of pounds of water which the burning body will raise from 32° to 212° F. The last plan is the more easily managed and accurate, and serves as the index in the following table, which gives the number of pounds of water raised from 32° to 212° F. during the C. of one pound of each of the burning bodies:

		lbs. of water.
Charcoal, pure	78	"
" from wood	75	"
Wood, dried	36	"
" undried	27	"
Coal, bituminous	60	"
Turf and Peat	25 to 30	"
Alcohol	67½	"
Olive oil, wax, &c	90 to 95	"
Ether	80	"
Hydrogen	236½	"

The amount of heat evolved appears, however, to be proportional to the quantity of oxygen required to burn the various combustibles. Thus, when a similar volume of oxygen gas, or even ordinary air, is allowed to flow against the various combustible substances, the following results are obtained:

One lb. oxygen combining with	Raises from 32 to 212 degrees F.
Hydrogen	29½ lbs. of water.
Charcoal	29 "
Ether	28 "
Alcohol	28½ "

While the absolute amount of heat evolved during the C. of any burning body is the same, yet the sensible heat may vary according to the rapidity of the process. Thus, when phosphorus is exposed to the air at ordinary temperatures, it very slowly combines with oxygen, and gives out little heat at any one moment, but it is diffused over a great length of time; whilst if the phosphorus is set fire to in the air, it burns vividly, and gives out much heat and light for a short time; and still further, if the burning phosphorus be placed in pure oxygen, it enters into most vivid C., and evolves a most intense heat and brilliant light for a still shorter time. In the latter instances, the heat evolved at any one moment is greater, because more rapid, than that given off at the same time during the slower process of C.; but when allowed

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to proceed to a termination, there is as much heat produced during the whole time occupied in its development. The same remark applies to the coal placed in a furnace. So long as the door of the furnace is open, and there is little draft of air through the fuel, a moderate amount of heat is evolved, which may last for several hours; but when the door is shut, and much air is drawn through the coal, the latter is more quickly burned, and more heat is evolved during a shorter period of time than before, but in the long-run there is the same amount of heat evolved.

CO'MEDY. See DRAMA.

COMENIUS, John Amos, the most distinguished educational reformer of the early part of the 17th c., was born on the 28th of March 1592, according to some, at Comna, near Brünn; according to others, at Niwnitz, in Moravia. His parents belonged to the community of the Moravian Brethren. C. studied at Herborn, and then at Heidelberg, after which he travelled through Holland and England, and at last settled at Lissa, in Poland, where he was chosen bishop of the Moravian Brethren. In 1631, he published his "Janua Linguarum Reserata," which was translated into many European, and even into some Oriental languages. In this work, he points out a method of learning languages new at that time, which may be called the intuitive or perceptive system, in which the pupils were taught by a series of lessons on subjects easily understood or appreciable by the senses—such as natural history, the sciences, different trades and professions, &c. C. also published about the same time the "Ratio Disciplinæ Ordinisque Ecclesiæ in Unitate Fratrum Bohemorum" (1632), republished with remarks by Buddæus (Halle, 1702); and his "Pansophiæ Prodromus" (1639). In 1641, C. was invited to England, to assist in reforming the system of public instruction; but as the breaking out of the civil war prevented the execution of this design, he went to Sweden, where he was patronised by Oxenstiern, who gave him a commission to draw up a plan for the organisation of schools in Sweden, which he completed at Elbing, four years afterwards. He next went to Hungary for a similar purpose. Here he composed his celebrated "Orbis Sensualium Pictus," or The Visible World (Nürn. 1658), the first picture-book for children, which has been often reprinted and imitated. Finally, he settled in Amsterdam, where he published several other works. C. died at Naarden on the 15th October 1671. In the latter years of his life, C. gave way to fanaticism, misinterpreted the Revelation of St John to suit his fancies of the existing state of Europe, and expected the millennium in 1672. An interesting account of the wanderings and sufferings of C., and of his great services in the cause of popular education, is given in K. G. von Raumer's "Geschichte der Pädagogik."

CO'MÈS, an ancient officer with territorial jurisdiction. See EARL.

CO'MET. The word C. is derived from the Gr. *kómē*, hair, a title which had its origin in the hairy appearance often exhibited by the haze or luminous vapor, the presence of which is at first sight the most striking characteristic of the celestial bodies called by this name. The general features of a C. are—a definite point or nucleus, a nebulous light surrounding the nucleus, and a luminous train preceding or following the nucleus. Anciently, when the train preceded the nucleus—as is the case when a C. has passed its perihelion and recedes from the sun—it was called the beard, being only termed the tail when seen following the nucleus as the sun is approached. This distinction has disappeared from all modern astronomical works, and the latter name is given to the appendage, whatever its apparent position. Neither this luminous attendant, the tail, nor the nucleus, is now considered an essential cometary element, but all bodies are classed as comets which have a motion of their own and describe orbits of an extremely elongated form. There are several plain points of difference between comets and planets. The planets move in the same direction, from west to east, which is astronomically called "direct motion;" but the movements of comets are often from east to west, or retrograde. The orbits of all the planets are confined to a zone of no great breadth on either side of the ecliptic; but the paths of comets cut the ecliptic in every direction, some being even perpendicular to it. The orbits of all the planets are nearly circular; or, more properly speaking, are ellipses of very small eccentricity. The orbits of comets, on the other hand, present every variety of eccentricity, some of them being ellipses or elongated closed orbits of various degrees of elongation; others, hyperbolas; while the majority have a form of orbit not differing sensibly from the parabola, which is the

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limiting form of curve to which both the ellipse and hyperbola approximate, under given conditions.

Any attraction of an extraneous body interfering with the attraction of the sun might change the orbit from the ellipse to the hyperbola, and *vice versa*, or from the parabola to either. As, however, there is only one parabola corresponding to infinite sets of ellipses and hyperbolas, an interfering cause is not likely to change the orbit from an ellipse or hyperbola to the parabolic form. Of about 200 comets whose orbits have been obtained with more or less accuracy, 40 appear to have described ellipses, 7 hyperbolas, and 150 orbits that cannot be distinguished from parabolas.

The discovery that comets are celestial bodies, extraneous to our atmosphere, is due to Tycho Brahé, who ascertained the fact by observations of the C. of 1577. Newton succeeded in demonstrating that they are guided in their movements by the same principle which controls the planets in their orbits; and Halley was the first, by determining the parabolic elements of a number of comets from the recorded observations, to identify the C. of 1682 with one which had been observed in 1607 and the observations recorded by Kepler and Longomontanus, and also with a C. observed in 1531 by Apian, at Ingolstadt, and thus confidently to predict the return, at the end of 1758 or beginning of 1759, of a C. which would have the same parabolic elements. These parabolic elements are elements of a parabola nearly coincident with the elongated elliptic orbit of the comet. They are—1. *The Inclination.* 2. *The longitude of the node.* These two determine the plane of the orbit. 3. The longitude of the *perihelion*, or point of nearest approach to the sun. 4. The perihelion distance, or nearness of approach to the sun. 5. The direction of motion, whether *direct or retrograde.*

To determine these parabolic elements three observations of the C. are sufficient; and by a table of such elements deduced from the recorded observations, it is possible at once to ascertain whether any newly observed C. is identical with any that have been previously observed. To predict, however, with accuracy the time of the return of a C., a much more accurate calculation must be made of the orbit, taking into account the perturbations of the planets to whose influence it is subject. This difficult problem was solved, in the case of Halley's C., by the joint work of Laland, Madame Lapante, and Clairaut, who announced, in November 1758, just as astronomers began to look out for the return of the C., that it would take 618 days more to return to the perihelion than on the preceeding revolution. The perihelion passage was fixed about the middle of April 1759; but Clairaut distinctly forewarned the world that, being pressed for time, he had neglected small values, which collectively might amount to about a month in the seventy-six years. The C. passed the perihelion on the 12th March 1759, exactly a month before the time announced, but within the assigned limits of divergence from that date. The elements of its orbit proclaimed it to be the C. of the former periods by their similarity. For the next perihelion passage, the different calculations executed by MM. Damoiseau and De Pontécoulant, fixed the 4th, the 7th, and the 13th November 1835. Subsequently, observations indicated the 16th—that is to say, a deviation of only three days from what turned out the most accurate calculation, and a deviation of 12 days from the most remote. We have adverted to the perihelion passages of this C. in 1531, 1607, 1682, 1759, and 1835. It is also now identified with a C. observed in 1456, and one in 1378, recorded by Chinese observations. There are no sufficiently reliable European observations previous to 1456, but it is conjectured by Arago, that this C. is the same with the C. of 1305; that of 1230; a C. mentioned in 1006 by Hali Ben Rodoan; that of 885; finally, a C. seen in the year 52 before our era.

This account of Halley's C. has been given at length to illustrate the principles on which the calculations are made. There are three other comets whose periodicity is established, and whose paths are accurately known.

1. That of Encke, with a short period of 1204 days. Its orbit does not extend so far as the orbit of Jupiter, and a slight acceleration in its periodic times of return has suggested the possibility of the space, within our solar system at least, being occupied by a resisting medium, though of extreme rarity.

2. That of Biela or Gambart, having a period of six years and three-quarters. During the visit of this C., in 1846, it was seen to separate into two distinct comets,

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which kept moving side by side till they disappeared. On the return of the C. in the autumn of 1852, the distance between the two nuclei had much increased. Since then, although twice due, it has not again been seen.

3. That of Faye, with a period of seven years and a half.

The orbits of both these last extend beyond the orbit of Jupiter, but not so far as that of Saturn.

The above are the only comets whose orbits are considered by astronomers as established, although there are others whose orbits are ascertained with a less degree of accuracy and certainty, requiring the test of future returns to fix their periodicity. One other deserves mention from the great peculiarities of its course.

In the month of June 1770, Messier discovered a C. which remained visible a long time, and enabled Lexell to ascertain the orbit to be an ellipse whose major axis was only three times the diameter of the earth's orbit, and corresponded to a periodic revolution of 5½ years. This result suggested grave difficulties. It had been found impossible to identify this C. with any previously observed, and yet it was difficult to conceive that a bright C., with so short a period of return, should have previously escaped observation. What was still more remarkable, it was never seen again, though anxiously looked for in the places where Lexell's orbit would have brought it. It became popularly called Lexell's lost C., and gave occasion to many sarcasms by the wits of the day at the expense of astronomers, who had so much boasted of having found the key to the cometary movements. In the present day, the explanation is complete. The C. was never seen before 1770, because its orbit previously had been totally different, its nearest point to the sun having been as distant as the path of Jupiter. Its appearance that year arose out of the fact, that in 1767 it was in such close contact with Jupiter, moving in the same direction, and nearly in the same plane, that the attraction of this planet entirely changed its orbit. But why has the C. not since been seen? Its passage to the point of perihelion in 1776 took place by day; and in 1779, before another return, it again encountered the vast body of Jupiter, and suffered a fresh orbital derangement, the attraction of the planet deflecting it into more distant regions, and so changing the form of the orbit, that if it had again been visible, it would not have been recognised as identical with Lexell's comet.

The celebrated C. of 1680, which furnished Newton with the occasion for proving that comets revolve around the sun in conic sections, and that, consequently, they are retained in their orbits by the same force as that which regulates the movements of the planets, appears to have been about the most remarkable for brilliancy of any of which we have authentic accounts. This C. is supposed to be identical with the one that appeared about the time of Cæsar's death (44 B.C.), with that which was seen in the reign of Justinian in the year 531, and with another in the year 1106, in the reign of Henry II., the period of revolution, according to the orbit calculated for it by Whiston, being about 575 years. There is, however, some doubt among astronomers as to the real form of its orbit, the one assigned to it by Encke giving it a period of 8813 years. This C. approached nearer to the sun than any known, except perhaps the C. of 1843, the calculation of whose perihelion distance, from the paucity of observations, has little certainty. The C. of 1680 approached the sun within the 168d of the semi-diameter of the earth's orbit. The tail of a comet is nearly always away from the sun, frequently assuming a curved form. It increases in length with its proximity to the sun, but does not acquire its greatest length till after passing the perihelion. These are usual characteristics of comets, which were exemplified by this one in a remarkable degree. These phenomena might be accounted for if we were to regard the train as vaporisation produced by the intense heat to which the body of the C. is exposed in its approach to the sun.

In the present century, the comets most remarkable for brilliancy have been the C. of 1811, that of 1843, and that of 1858 (Donati's).

Spectroscopic investigation, so far as yet pursued, points to the conclusion that the nucleus is self-luminous, but that the tail shines with reflected light. It has been discovered recently, in determining the tracks of those streams of dark bodies that cause meteoric showers, that some of the tracks coincide with the orbits of well-known comets. From this, it is inferred that star-showers and comets may be only different manifestations of the same thing (see METEORS).

What the matter of the comets consists of is, of course, only a subject for specu-

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lation. The composition of the nebulosity and the tail, is at all events, something of almost inconceivable tenuity, as shewn by three considerations. 1. Stars seen through them suffer no diminution of brightness, though the light must have to traverse sometimes millions of miles of the cometary atmosphere. 2. Though the thickness of the tail of a C. may be millions of miles, and its length of course much greater, the comets have never been observed to cause any sensible disturbance of the planetary motions, though approaching near enough to be themselves so much affected as to change the entire character of the orbit. 3. The curvature of the tails, and the acceleration of the periodic time, in the case of Encke's C., indicate their being affected by a resisting medium, which has never been observed to have the slightest influence on the planetary periods, though so long observed. Even the nuclei of comets appear to be of extremely small density. This may be inferred, though with less force than regards the tails, from the two last considerations above mentioned; and, moreover, there are reliable accounts of stars of a very low order of magnitude being seen through the nuclei themselves.

Comets have been alternately regarded with terror and with welcome in the popular mind. The appearance of Halley's C., in 1456, just as the Turks had become masters of Constantinople, and threatened an advance into Europe, was regarded by Christendom with a superstitious dread, and to the Ave Maria was added the prayer: "Lord save us from the devil, the Turk, and the comet." At Constantinople, the occurrence of a lunar eclipse at the same time, increased the portentousness of the event. The discoveries of science of the magnitude of the space filled by their bodies, and their prodigious velocity, together with the confessed impossibility of always predicting their approach, produced fears of another kind, which have sometimes been, especially in France, extravagantly exaggerated in the public mind. The groundlessness of such alarms, from the extreme improbability of collision with the nucleus, the probable innocuousness of a contact with the extremely attenuated surrounding matter, and, possibly, to the greater part of the world, of a collision with the nucleus itself, will be sufficiently evident from what has been said above. It is probable that already, on many occasions, some of the attenuated vapor in the tail of comets must have come within the earth's attraction, and been absorbed in its atmosphere. Whether the effect is deleterious or salubrious, or whether it has any perceptible influence at all, is only matter of speculation. The salubrity of cometary influence is now a popular idea; and the vintages of 1811 and 1858 were favorable seasons, whose produce is often advertised as the C. wines. It is scarcely worth while, however, to follow further speculation on these subjects, and it has been considered preferable to confine this article chiefly to the description of the general characteristics of comets, and the facts respecting them afforded by science.

CO'MFREY (*Symphytum*), a genus of plants of the natural order *Boragineæ*, distinguished by a 5-cleft or 5-partite calyx, and a corolla enlarged upwards, its throat closed by awl-shaped scales. The species, which are not numerous, are natives of Europe and the north of Asia. They are perennial plants of coarse appearance, although occasionally to be seen in flower-borders. *S. officinale* (the COMMON C.) and *S. tuberosum* are natives of Britain, frequent in shady and moist places. *S. officinale* was formerly much esteemed as a vulnerary, on account of its astringency. Its young leaves and its blanched shoots are also occasionally used as boiled vegetables. The Prickly C. (*S. asperrimum*), a native of Siberia, 6—10 feet in height, has been highly recommended for feeding cattle.

COMINES, or Comynes, Philippe de, Sieur d' Argenton, a French statesman, and the author of some very interesting and valuable "Memoirs," was born at the castle of Comines, not far from Lille, in 1445. After receiving a careful education, he passed into the court of Burgundy about 1466, and attached himself particularly to Charles the Bold (then Comte de Charolais). In 1472, C., who was anything but punctilious in his notions of honor, entered the service of Louis XI., the rival and enemy of Charles, who immediately covered him with honors, and made him one of his most confidential advisers. He proved himself a very suitable agent for carrying out the designs of the crafty monarch; but after the death of Louis, by his adherence to the party of the Duke of Orleans, C. incurred the displeasure of the government of Anne of Beaujeu, and was sentenced to a forfeiture of a fourth of his estates and to ten years' banishment. This punishment, however,

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does not seem to have been carried out, for after a few years, we find C. again employed in important affairs of diplomacy. Though engaged in the service of Charles VIII. and the Duke of Orleans, afterwards XII., C. failed to win the confidence of these masters. He died at his castle of Argenton, October 17, 1509. C.'s "Memoirs" are admirably written, and afford abundant proof that he possessed a clear, acute, and vigorous mind. He seems to have looked keenly into the heart of every man who crossed him in life, and with cool, severe anatomy, dissects him for the benefit of posterity. The best edition of his "Memoirs" was edited by Lenglet Dufresnoy (4 vols., London, 1747).

COMI'SO, a town of Sicily, in the province of Syracuse, about 40 miles west-south-west of the city of that name. It has paper manufactures, and a population of (1871) 16,694.

COMI'TIA (Lat. *cum*, with or together, and *ire*, to go) were the legal or constitutional meetings of the Roman people, convened by a magistrate, for the purpose of putting a question to the vote. This definition at least comprehends all the C., except the C. *Calata*, where the people were merely present as spectators. There were several kinds of C. (*C. centuriata*, *C. tributa*, &c.) held for different purposes; and according to the mode of constituting the C., the preponderance lay with the patricians or with the plebeians.

CO'MITY OF NA'TIONS—more frequently mentioned by its Latin equivalent, *comitas gentium*—is that species of international legal courtesy by which the laws and institutions of one country are recognised and given effect to by those of another. "In the silence of any positive rule," says Mr. Justice Story, "affirming, or denying, or restraining the operation of foreign laws, courts of justice presume the tacit adoption of them by their own government, unless they are repugnant to its policy or prejudicial to its interests." From the existence of so great a number of independent states on the continent of Europe, and of federated states in America, the *comitas gentium* is more called into play in these countries than in our own, and it has consequently been more extensively discussed by their legal writers. See Story's "Conflict of Laws." See INTERNATIONAL LAW.

CO'MMA, in the mathematical study of sound, is applied to two small intervals, which, by comparison and calculation, arise as the difference between the proportions of certain other intervals of the diatonic scale. The larger, but seldomer occurring C. is called the *C. ditonicum*, or the Pythagorean C., being the difference between the true octave, whose ratio is 2 : 1, and the interval which arises when the octave is obtained by tuning a progression of twelve perfect fifths, or arithmetically by adding their values together; by which process it is found that the last sound is greater than the true octave in the proportion of 531,441 to 524,288. The smaller C., *C. syntonum*, or C. of Didymus, is—First, the difference between the large whole tone, the ratio of which is 9 : 8, and the small whole tone 9 : 10, which is found in the compound of these ratios produced by multiplying together respectively their antecedents, 9 and 9, and their consequents, 8 and 10, to be 81 : 80. Second, The difference between the great limma, 27 : 25, and the great half-tone, 15 : 16, which is found by the same process, and then reducing the resulting ratio to its least terms, to be also 81 : 80. Third, The difference between the diesis, 128 : 125, and the diaschisma, 2048 : 2025, which by the same process gives 81 : 80; and lastly, the difference between the *small* limma, 135 : 128, and the small half-tone, 24 : 25, which again gives the proportions 81 : 80. The difference between the *C. ditonicum* and the *C. syntonum* is exactly the *schisma*; therefore, the aggregate of the diaschisma and schisma, if they be added together, is neither more nor less than the syntonic comma. This C., again added to the diaschisma, makes up the diesis, and added to the great half-tone, makes up the great limma. It follows therefore that, practically, two enharmonic tones in perfect tune never differ by a syntonic C., and it is wrong to say that *d* flat is higher than *c* sharp by a C., while the real difference is that of a diesis, 128 : 125. In the equal-tempered scale, these varieties do not exist. The term *syntonic* comes from the Greek, and means equal-sounding.

COMMANDA'NT, in Military matters, is a temporary commander, in place of the real chief; such as a captain-commandant, lieutenant-commandant, &c. In foreign armies, the designation is more frequently applied than in the British, especially to the commanders of garrisons.

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COMMA'NDER, in the British Navy, is an officer next under a captain of rank, and serves either as second in command in a large ship, or in independent command of a vessel smaller than the sixth rate. In matters of etiquette, he ranks with a lieutenant-colonel in the army. There were in 1873, 155 commanders in commission, with pay of £1 per day; while there were 154 on half-pay, but eligible for re-employment, and 326 on retired half-pay; but the whole list of those employed, or eligible for employment, is to be reduced to 200. Half-pay ranges from 8s. 6d. to £400 a year. Retirement is optional at the age of 45; and compulsory at 50, or at any earlier age after 5 years without employment. In 1876 there were 207 commaders in commission.

COMMANDER-IN-CHIEF is the highest staff appointment in the British army. It is held by the general commanding all the forces in India, and would probably be given to the leader of any *large* army in the field, whether abroad or at home. Formerly, the army at home was administered by an officer of this rank; but since the death of the Duke of Wellington, in 1852, the military administration has vested in an officer holding no higher commission than that of "General on the Staff;" who is called the general (or field-marshal, according to the holder's army rank) commanding in chief. Since 1855 this officer has been strictly subordinate to the Secretary of State for War. The office of the C., technically known as the "Horse Guards," is a department of the War Office, and comprises the sub-departments of the military secretary, the adjutant-general, and the quartermaster-general, with a staff of clerks. Under the "War Office Act" of 1870, and by orders in council of that year, the officer commanding in chief is one of the three great officers who administer the military affairs of the country under the Secretary of State for War; his department being that of military command, discipline, and promotion. In practice, he makes all promotions and military appointments; though in theory, these are all made on the responsibility of the Secretary of State. Appointments to very important positions on the staff would not be made without the supervision of the minister and probable concurrence of the cabinet. The officer commanding in chief is responsible for all recruiting operations, and for the appropriation of troops to particular localities; but he exercises rather a general inspectional control than any immediate command over the men. The actual command vests in the general officers commanding the districts into which the kingdom is parcelled.

A *naval* C. is the chief admiral at any port or station.

COMMANDITE, Société en, or Partnership in, an expression used for at least two centuries in France, to express a partnership in which one may advance capital without taking charge of the business, or may become a "sleeping partner," as it is called in this country. The term owes its origin to the old meaning in the commercial nomenclature of France of the word command, which was applied to one person authorising another to transact business for him. The working partner had a *commande* from him who merely advanced capital. The term has acquired importance of late in political economy, because the law of France could exempt the sleeping partners from responsibility beyond the amount they might agree to be responsible for. On the other hand, by the law of the United Kingdom, down to the passing of the limited liability act, every partner of a company was liable for all its debts. Hence, in the discussions about the question, whether it would be prudent to relax this law, and permit persons to invest money in trading companies without undergoing this responsibility, such companies were called "partnerships in commandite."

COMMELYNA'CEÆ, a natural order of endogenous plants, consisting of herbaceous plants, with flat, narrow leaves, usually sheathing at the base. The calyx is 3-partite; the petals three, sometimes cohering at the base. The stamens are six, inserted under the ovary, which is 3-celled; the style is single. The fruit is a capsule, with 2—3 cells and 2—3 valves, bursting through the middle of the valves. The seeds are often in pairs, inserted by their whole side on the inner angle of the cell; the embyro lies in a cavity of the albumen. The order contains more than 260 known species, natives chiefly of warm climates; but a few occur in North America. None are European. *Tradescantia Virginica*, or SPIDER-WORT, common in our flower-gardens, is a familiar example of the order. *Commelyna cœlestis* is a fine

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ornament of our flower-gardens. The treatment is somewhat like that of the dahlia.

COMMEMORA'TION, or Encæ'nia, the great festival of the Oxford academic year, usually takes place on the third Wednesday after Trinity Sunday. It is of very ancient date, public exercises and recitations having been held from time immemorial in honor of the act, or period when Masters of Arts and Doctors complete their degrees, at first in St. Mary's Church, but subsequently to the erection of the Sheldonian Theatre (1669), in that building.

At present, the proceedings consist of a Latin oration in honor of founders and benefactors, delivered in alternate years (according to the bequest of Lord Crewe, Bishop of Durham) by the Public Orator and the Professor of Poetry; the presentation of the honorary degree of D.C.L. to strangers eminent in science, politics, etc., who are introduced to the Chancellor, or, in his absence, to the Vice-chancellor, by the Public Orator, in a short Latin speech; and the recitation of the Newdigate or English prize poem, the Latin prize poem, and the Latin and English prize essays, the three last named prizes being the gift of the Chancellor. During the ceremonial, the northern extremity of the theatre is occupied by the Vice-chancellor, doctors, proctors, &c.; the area or pit by Masters of Arts and their friends; the lower seats in the semicircle by lady visitors; and the upper, or gallery, by Bachelors and Undergraduates, who claim on this occasion all the time-honored privileges of a gallery audience. Commemmoration Day itself is only the culminating point of a week of gaiety, in which concerts, balls, theatrical representations, &c. replace the usual studies of the university, and in which heads of houses and tutors are only tolerated in so far as they give a sort of official sanction to the general festivity. In the theatre itself, the more strictly academic and solemn portion of the proceedings receives but scanty respect from the majority of the audience. A momentary pause may perhaps be made when the "Newdigate" is being recited, or when some "lion" of unusual mark advances to receive his degree; but as a rule, the noisy humors of the gallery command much more attention than the stately periods of the Public Orator, or the timid recitations of the prize essayists. Of late, however, a feeling has sprung up among the senior members of the university (shared in, it is said, by several distinguished strangers) that the licence of the gallery has exceeded all due limits; and in 1876 a change was made in the interior arrangements, the under-graduates not occupying a separate gallery, but being distributed among the ladies.

The Vice-chancellor, who holds his office for four years, generally presides at Commemoration, but it usual for the Chancellor to do so once in the period of each vice-chancellorship. These occasions are called Grand Commemorations.

COMME'NDAM. When a clerk is promoted to a bishopric, all his other preferments become void from the moment of consecration; but a method was devised by which the substantial interest in the living was retained by its being *commended* to the care of a bishop (called the commendatory) by the the crown, till a proper pastor should be provided for it. Such a living was called an *ecclesia commendata*, and it was said to be held *in commendam*. The holding on this title might be really temporary for one, two, or three years, or it might be perpetual. By 6 and 7 Will. IV. c. 77, s. 18, it is provided that no ecclesiastical dignity, office, or benefice shall be held in C. by any bishop, unless he shall have held the same when the act passed. —Stephen, iii, 87.

COMMENDA'TORS, in Scotland, in Roman Catholic times, were stewards appointed to levy the fruits of a benefice during a vacancy. They were mere trustees; but gradually the pope assumed the power of appointing C. for life, without any obligation to account. "This was chiefly intended as a cloak for the plurality of benefices, and to evade the canon of the second council of Nice, by which one benefice only was allowed to be given to one and the same churchman; but all commendators were by our law prohibited, even during popery, by 1466, c. 8, except those that should be granted by bishops for a term not exceeding six months."—"Erskine's Instit.", vol. i. p. 96, Ivory's edit. See ABBOT.

COMME'NSURABLE. Two quantities or numbers are said to be commensurable which are of the same kind, and each of which contains a third quantity or

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number a certain number of times without remainder. See INCOMMENSURABLE MAGNITUDES.

COMMERCIAL LAW. See MERCANTILE LAW.

COMMINA'TION is from the Lat. *comminor*, to threaten, and is the name given to a penitential service used in the primitive church. In the earliest ages, those who were guilty of grievous and notorious sins were put out of the church, until on their repentance and after long trial, they were restored to full communion. It seems that, at least from the beginning of the 8th c., there was an office of this kind for public penitents on the first day of Lent; but from various causes the penitential discipline became extinct, both in the Eastern and Western Churches, and the office for Ash-Wednesday (so called from the penitents coming clad in sackcloth and ashes) is the only memorial of it left. The office, as used in the Church of England, is nearly the same as those found in the Salisbury and York missals. The curses contained in Deut. xxvii. against impenitent sinners are read, and the congregation answer "Amen" to every sentence, as acknowledging the justice of the sentences. See Bingham's "Antiquities."

COMMISSA'RIAT is a name for the organized system whereby armies are provided with food, and daily necessaries other than those connected with actual warfare. Among the ancients the Romans attended best to the C.; the *quæstors* were the commissaries. In feudal times, the soldiers were mainly dependent for food on their lords; but they lived very much by plunder. During the wars of the Crusades, the C. was so utterly neglected, that thousands died of starvation.

In England, the first germ of the modern C. appeared in the office of *provisiomaster*, in the time of Queen Elizabeth. Under Charles I., commissaries were stationed in the different counties. Under Marlborough's command, the troops were supplied by contract; he received a percentage, and peculation was very common. After many changes during the 18th c., a commissary-general was appointed in 1798, to superintend all contracts for food and forage. The dire experience of the Crimean war shewed how greatly reform was required in this important department. In 1858 and 1859, accordingly, it was newly organised; and remained, until 1870, a War-office department, under a comissary-general-in-chief.

In 1870, the Commissariat was merged with other supply departments in the great "Control Department," which, under the Surveyor-General of the Ordnance, performed all the civil administrative duties of the army. In Dec. 1875, the Control Department fell from its high estate, and the "Commissariat and Transport Department" arose from its ashes. Its duties are the provision of food, fuel, lodging, and transport: a function on which it is needless to say the very existence of the army depends. The Department is administered by the Director of Supplies, at the War Office, who is an officer on the staff of the Surveyor General. The ranks of Commissariat officers are commissary-general (ranking as brigadier-general), deputy-commissary-general (as colonel), assistant commissary-general (as lieut.-colonel), commissary (as major), deputy-commissary (as captain), assistant-commissary (as lieutenant) and sub-assistant commissary.

COMMISSARY in general, is any one to whom the power and authority of another is committed. In this sense, it nearly equivalent to commissioner. In ecclesiastical law, a C. is an officer appointed by a bishop to exercise jurisdiction in parts of the diocese which are so distant from the episcopal city that the people cannot be conveniently summoned to attend the principal court.

When the papal authority, and all jurisdiction which flowed from it, was abolished in Scotland, by the Acts 1560 and 1567, a supreme C. court was established in Edinburgh, by a grant of Queen Mary, Feb. 8, 1563. This court had jurisdiction in actions of divorce, declarators of marriage, nullity of marriage, and all actions which originally belonged to the bishop's ecclesiastical courts. Its powers were gradually conjoined with those of the Court of Sessions, and it was finally abolished in 1836 (6 and 7 Will. IV. c. 41), the small remains of its once important jurisdiction being united in the sheriff of Edinburgh. The inferior commissariats, which had usually been commensurate with the dioceses, were dealt with by a previous statute (4 Geo. IV., c. 97), each county being erected into a separate commissariat, of which the sheriff was commissary. The jurisdiction of these courts so conjoined with that of sheriffs was, in 1876, finally transferred to the sheriffs absolutely, and the separation between

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the two sets of officers ended, except in the case of the Commissary Clerk of Edinburg. See Alexander on "Practice of the Commissary Courts in Scotland," 1868, which gives a very interesting sketch of the history, constitution, and jurisdiction of these courts.

COMMENTRY, a town of France, in the dep. of Allier, eight miles south-east of Montlucon, on the Œuil. It stands in the centre of one of the most important coal-fields of France, and within the last thirty years has risen from a mere village to be a busy and populous town. Pop. (1872) 9068, mostly engaged in the coal-mines and iron-works. A railway connects it with Montlucon and other places and with the Canal de Berry. In 1846, an immense fire consumed an enormous quantity of the coal in the mines.

COMMI'SSION, a writing in the form of a warrant or letter-patent (see PATENT) authorising one or more persons to perform duties or exercise powers belonging to another, or to others. Instruments of delegation, bearing this title, are issued by the crown to officers in the army and navy, judges, justices of the peace, and others.

Another class of commissions are those granted sometimes by the crown, and sometimes by parliament, to a body of persons, either to inquire into the condition of certain institutions or branches of the public service, or to exercise certain powers, or execute certain measures for their improvement. Persons holding such commissions, deriving no other title from their appointment, are called commissioners; e. g., the English Ecclesiastical Commissioners, the Commissioners for the Relief of the Poor, the Commissioners for the Affairs of India, the Emigration Commissioners, &c.

COMMISSION DEL CRE'DERÉ. See DEL CREDERE COMMISSION.

COMMISSION MERCHANT, or Agent, called also abroker, or factor, is a person employed to sell goods consigned or delivered to him by another who is called his principal, for a certain percentage, commonly called his principal, a certain percentage, commonly called his commission or factorage. As the goods thus received are said to be consigned, the C. M. or agent is often called a consignee.

COMMISSION OF ASSEMBLY. See GENERAL ASSEMBLY.

COMMISSIONAIRES are a class of attendants at continental hotels, who perform certain miscellaneous services. Employed to attend at the arrival of railway-trains and steam-boats to secure customers, they wait to take charge of luggage, see it passed through the hands of the custom-house officers, and send it on to the hotel; for all which service they charge a fee. They likewise procure visés to passports, and act as valets-de-place. In this last capacity, they may be hired for the day to conduct strangers to public places of interest, galleries of art, or other sights. In Paris, they are generally respectable and intelligent, and speak English with tolerable fluency. In the French outports, such as Boulogne, they can be referred to less favorably.—Lately, a body of C. has been established in London, and also in Edinburgh, consisting of maimed soldiers who have retired with a pension, and are of unexceptionable character. On a moderate tariff of charges, they act as messengers, light-porters, valets-de-place, and make themselves otherwise useful.

COMMI'SSIONER, in Scotch Bankruptcy. This office has little or no resemblance to that of the judge in England bearing once such a title. In Scotland, three commissioners are appointed by the creditors to advise, and in certain cases to superintend the trustee, who is the party charged with the realization and distribution of the estate. The commissioners audit the trustee's accounts, they fix his remuneration, and they have to ascertain that the moneys collected by him have been duly lodged in bank. They themselves are not entitled to remuneration; and they cannot purchase any portion of the estate. Their qualification is to be creditors, or mandatories of creditors; but any disqualification for the office of trustee also unfits for this office.

COMMISSIONS, Army, are warrants for serving the crown in certain military offices. Those holding such authority are called *commissioned officers*. Non-commissioned officers form a step intermediate between commissioned officers and private soldiers. First commissions in the probationary rank of sub-lieutenant are granted by competitive examination open to every British subject of proper age and character. Subsequent—i. e., higher—commissions are given, up to the rank of lieutenant-colonel, by "selection tempered by seniority." The commission of colo-

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uel is attained by service only, and commissions as major-general, lieutenant-general, and general, follow by pure seniority. These remarks apply to cavalry and infantry only: commissions in the Artillery and Engineers are obtained—first, by passing a severe course of study at Woolwich Academy, admission to which is by open competition; later commissions by seniority entirely. Before November 1, 1871, commissions in the cavalry and infantry were partly obtained by purchase, under the system, now abolished, called the PURCHASE SYSTEM. The prices of commissions rose gradually from the time of Charles II. until the Russian war of 1853, when the *regulation prices* were as follows:

Rank.	Regulation Price of Commissions.	Diff. in value between the several Com. in succession.
LIFE GUARDS.		
Lieutenant-colonel	£7250	
Major	5350	£1900
Captain	3500	1850
Lieutenant	1785	1715
Cornet	1260	525
DRAGOON GUARDS AND DRAGOONS.		
Lieutenant-colonel	£6175	
Major	4575	£1600
Captain	3225	1350
Lieutenant	1190	2035
Cornet	840	350

(The prices of cavalry commissions were reduced in 1861 to infantry rates.)

FOOT GUARDS.			
Lieutenant-colonel		£9000	
Major, with rank of	Colonel	8300	£7000
Captain, "	Lieut.-col.	4800	3500
Lieutenant, "	Captain	2050	2750
Ensign, "	Lieutenant	1200	850

(In 1857, purchase was limited to the lower three ranks.)

LINE REGIMENTS.		
Lieutenant-colonel	£4500	
Major	3200	£1300
Captain	1800	1400
Lieutenant	700	1100
Ensign	450	250

The conditions of promotion, and the operation of the purchase system, will be considered under PROMOTION and PURCHASE-SYSTEM. In the navy, also, the chief officers hold their authority by commission. See OFFICERS: PROMOTION.

COMMITMENT. See IMPRISONMENT.

COMMI'TTEE (Fr. *comité*), a portion, generally consisting of not less than three members, selected from a more numerous body, to whom some special act to be performed, or investigation to be made, is *committed*. But though a C. usually consists of several members of the body by which it is appointed, it may consist of one member, or, what is more frequent, of the whole members acting in a different capacity from that which usually belongs to them. This latter form of C. is known in parliament as a C. of the whole House. In order to mark the distinction between the house itself and the same body when thus resolved into C., the Speaker in the Commons, and the Chancellor in the Lords, as soon as the C. is formed, leave the chair, which is occupied by the Chairman of C., a paid official, who is appointed at the commencement of every parliament. In the Commons, moreover, the mace, which usually lies on the table, is put under it when the House goes into committee.

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Of committees of the whole House, the most familiar examples are Committees of Supply (q. v.) and of Ways and Means (q. v.). The vote of a C. is of no force till it has been reported to and received by the House. In the case of every public bill, moreover, a C. of the whole House is constituted after the second, and before the third reading, in order that the details of the measure may be more carefully adjusted. In private bills, analogous functions are performed by select committees. Occasional matters requiring special investigation are also remitted to select committees. These, for the most part, conduct their investigations in public; but there are instances also in which the public safety seems to require secrecy, in which they deliberate with closed doors, and they are then called *Secret Committees*.

COMMODORE, in the Navy, is a rank intermediate between an admiral and a captain. It is not permanent, but is bestowed for a time on a captain. Usually, a C. commands more ships than one, detached from a fleet on some special service; he hoists at that time a pendant. If a C. of the first class, his pendant is broad and red, pointed at the outer end; if of the second class, blue. A C. is privileged to have a commander under him in his ship, in the same way as an admiral is privileged to have a captain. The C., in matters of etiquette, ranks on a level with a brigadier-general in the army. The pay of a C. is £1095 per annum, when in command, in addition to-table money of the same amount.

COMMODUS, Lucius Aurelius, a Roman emperor, born 161 A.D., was the son of Marcus Aurelius Antoninus. Great pains was taken with his education. But the solicitude of his father was all to no purpose. C. only waited for an opportunity to exhibit as startling and detestable a mixture of sensuality, cruelty, and meanness as had ever been witnessed in Rome. When he was summoned to the throne on his father's decease, 17th March 180, he manifested a shameful eagerness to plunge into the dissipations of Rome. At that period he was successfully fighting the Marcomanni and other tribes on the Upper Danube, and, not to be balked of his anticipated pleasures, he hastily concluded a treaty with the barbarians, and reached the capital in the beginning of the autumn. The cruelty to which he was always prone, was especially called into action after a conspiracy by his sister Lucilla against his life had been discovered in the year 183. Nearly all who, by virtue, ability, and learning, had risen to honor during his father's lifetime, were sacrificed to appease his savage jealousy of the good and the great. Gross prodigality in the expenditure of the resources of the state on the amusements of the amphitheatre also marked his reign. He was proud of his own physical strength, and exhibited it in gladiatorial combats. For each of these exhibitions, he charged the state an enormous sum. He used also to sing, dance, play, act the buffoon, the pedlar, or the horse-dealer, and engage in all the filthy and horrible orgies of Egyptian sacrifice. A glutton, a debauchee, who wallowed in the most sensual abominations, he yet demanded to be worshipped as a god, and assumed the title of Hercules Romanus. Many plots were devised against the life of this mingled monster and madman, and at last one of them accomplished its purpose. His mistress, Marcia, in concert with the prefect Lætus and the imperial chamberlain Eclectus, after they had failed in an attempt to poison him, caused him to be strangled by Narcissus, a famous athlete, on the 31st December 192.

COMMON, in Law. This is one of the numerous instances in which a different meaning is attached to the same term in the legal systems of England and Scotland. In England, a C., as defined by Blackstone, is "a profit which a man hath *in the land of another*, as to feed his beasts, to catch fish, to dig turf, to cut wood, or the like." In Scotland, again, where the law has adopted the divisions, and followed nomenclature of the civil law, and of the legal systems of continental Europe, all these profits, or rights to derive profit, are known as *Servitudes* (q. v.), whereas a C., or Commonty, as it is more frequently called, is a common right of property existing in several individuals, frequently the inhabitants of a whole village, in a piece of ground. In each individual, the right of course is limited, so as in reality to amount to little more than a servitude; but there is no over-lord, the land is not the land of another, but the land of the community as a body.

The division of C. lands, or those over which C. is claimed, among the parties possessed of such rights, or the permission to the owner to enclose the lands on making compensation to the owners of C. rights, has been the subject of regulation

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by a very great number of statutes. Many of these are private acts, but the 6 and 7 Will. IV. c. 115 laid down general rules for effecting the purpose in future, without the necessity of obtaining an act of parliament, where the consent of two-thirds of the parties interested could be obtained, and the C. to be enclosed lay more than ten miles from London, and a specified distance from any other large town. By a subsequent statute (8 and 9 Vict. c. 118, amended by several later acts), a Board of Commissioners (see ENCLOSURE COMMISSIONERS) is appointed to inquire into the propriety of any proposed enclosure or partition, and to report to parliament, which then may pass a public act authorising the proceedings. This is the course generally adopted.

In Scotland, *commonties* or commons were made divisible by an action in the Court of Session, at the instance of any having interest, by the stat. 1695, c. 38.

On the subject of enclosing commons, Mr. J. S. Mill ("Dissertations and Discussions," vol. ii. p. 213) expresses the following decided opinion: "We must needs think, also, that there is something out of joint, when so much is said of the value of refining and humanising tastes to the laboring-people—when it is proposed to plant parks and lay out gardens for them, that they may enjoy more freely nature's gift alike to rich and poor, of sun, sky, and vegetation; and along with this a counter-progress is constantly going on of stopping up paths and enclosing commons. Is not this another case of giving with one hand and taking back more largely with the other? We look with the utmost jealousy upon any further enclosure of commons. In the greater part of this island, exclusive of the mountain and moor districts, there certainly is not more land remaining in a state of natural wildness than is desirable. Those who would make England resemble many parts of the continent, where every foot of soil is hemmed in by fences and covered over with the traces of human labor, should remember that where this is done, it is done for the use and benefit, not of the rich, but of the poor; and that in the countries where there remain no commons, the rich have no parks. The common is the peasant's park. Every argument for ploughing it up to raise more produce, applies *à fortiori* to the park, which is generally far more fertile. The effect of either, when done in the manner proposed, is only to make the poor more numerous, not better off. But what ought to be said when, as so often happens, the common is taken from the poor, that the whole or great part of it, may be added to the enclosed pleasure-domain of the rich? Is the miserable compensation, and though miserable not always granted, of a small scrap of the land to each of the cottagers who had a goose on the common, any equivalent to the poor generally, to the lovers of nature, or to future generations, for this legalized spoliation?

COMMON, Tenancy in. This is an Estate (q. v.) or a right in property accruing to two or more persons; and the nature of it is, that each has a distinct right to his own share, although no division has yet been made. But the common owners may agree to a partition, or one of them may, in equity, compel a partition. If the estate is one which passes by inheritance, the heir of each owner takes his share, and there is no benefit of survivorship. A tenancy in C. may be created either by a conveyance in express words, or by the parties obtaining their titles at different times, or at the same time from different parties. But if the title accrues by descent from the same ancestor, even though at different times, it is a tenancy in Coparcenary (q. v.).

COMMON BENCH. See BENCH and COMMON LAW, COURTS OF.

COMMON CHORD. See CHORD.

COMMON COUNTS. Short formal statements of the cause of action made in a Declaration (q. v.).

COMMON DEBTOR. See DEBTOR and CREDITOR.

COMMON FORMS are the ordinary clauses used in writs and deeds in England. It has been attempted to substitute, for some of these, short expressions conveying all the meaning of the C. F.; but the statutes by which the attempt was made (8 and 9 Vict. c. 119 and c. 124), being permissive merely, have as yet not affected practice. A main reason for the preservation of C. F. was the general rule that conveyancers were paid not according to value, or the difficulty of their task, but according to the length of a deed. A statute of the session (23 and 24 Vict. c. 145) made a further

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effort to abolish the C. F. used in appointing trustees, &c., by giving to them the powers which were formerly contained in the common forms. Brevity, however, gains ground.

COMMON GOOD. See CORPORATION.

COMMON HOUSE, or Common Room, was an apartment in a monastery in which a fire was constantly kept burning for the use of the monks, who frequently were allowed no fire anywhere else. The C. H. was presided over by a monk, who was called the master. It was the prototype of the common rooms in the colleges and halls of the English universities.

COMMON LAW, in England. These words, in their proper sense, signify the ancient consuetudinary law of England. The C. L. is therefore distinguished from the statute law and from equity. It is wholly overruled by the statute law. On the 2d November 1875, the C. L. courts were merged in the Supreme Court of Judicature by the act of 1873 (see COURTS OF COMMON LAW), with a view to incorporate equity also, when the two systems conflicted. Accordingly, the old relation between law and equity subsists, and the former maintains its force in spite of any discordant rules of equity, which can therefore now take effect through the intervention of a court by which the C. L. is in each particular case corrected or superseded. For an enunciation of cases in which this result is shewn, the reader is referred to the article under the heading EQUITY.

The C. L. is, in one sense, an unwritten law. Its rules have been handed down by tradition, sometimes in a complete and definite shape, such as the law of primogeniture, the jurisdiction of the courts, &c.; sometimes as a mere spirit or tendency, according to which, in novel cases, as they may arise, the law is to be expounded. Thus the law merchant is chiefly part of the C. L., although only some of its rules are of real antiquity, and the greater portion of them were developed no later than the last century. Therefore in such cases the C. L., though accounted traditional, is expanded by the judges who declare it, who enounce new rules suited to new combinations of circumstances, and merely bearing an analogy to what the ancient C. L. had established in cases which fell within its purview. It is therefore not wonderful that there should frequently be dispute as to what the C. L. is, and that different courts should occasionally give different decisions upon such questions.

As the C. L. has never been formally enacted, nor has yet been reduced to a regular code, it is to be sought for in the treatises of institutional writers and in the decisions of the courts of law. These last are of the highest authority, and where they are consistent, they are taken as irrevocably establishing the law. But being declaratory merely, and not imperative, a single judgment of a court is not held conclusive upon courts of equal jurisdiction, though it is commonly accepted as binding by inferior courts. A court may even depart from its own decision if it shall come to be of opinion that the law has before been incorrectly stated. But this principle perhaps undergoes an exception in the House of Lords, which being the highest court of all, it is laid down by some of the law peers that its judgments have the force of statute, and that the rules it has once sanctioned can be altered only by statute. The point has long been regarded as settled; and it is almost the only correct theory on which a court of supreme jurisdiction, like the House of Lords, can continue to exercise its functions.

The C. L. is applicable to the whole realm, but it is part of its principles, that in particular circumstances it may recognise rules which are not of universal application; thus, in certain courts, it adopts as its own the provisions of codes which it entirely rejects in other courts. The civil and canon law are in some of their rules recognised as part of the C. L. in the Maritime and Ecclesiastical Courts (including under the latter denomination the new courts of Probate and Divorce), but they are of no authority otherwise in the courts by which the main branches of the C. L. are administered. So also, in particular localities, customs exist which the C. L. sanctions, although they may be at variance with its general provisions. Such are the rules regarding succession which prevail in Kent under the name of Gavelkind (q. v.) and in certain towns under the name of Borough English (q. v.). But customs of much more circumscribed operation are, when proved, equally accepted by the C. L. as part of itself within the limits in which it prevails; for the C. L. deems it not inconsistent to adopt a contrary rule to its own, if clear and uniform and confined

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to one locality. In order to entitle a custom to the force of law, it must be of such endurance "whereof the memory of man runneth not to the contrary." The period thus indicated is more precisely defined as extending to the commencement of the reign of Richard I. By this is meant, however, not that the custom must be proved to have been in perpetual vigor since that remote epoch, but that proof of its non-existence within that period will invalidate it. If no such proof is adduced, the custom will be established by the evidence of experienced living witnesses, or by such documentary evidence as is inconsistent with any other assumption.

COMMON LAW, Courts of. These are generally divided into Superior and Inferior. The superior sit at Westminster, and hence are often called the Courts at Westminster. They had the names of the Court of Queen's Bench, the Court of Common Pleas or of Common Bench, and the Court of Exchequer. These are all offshoots of the great court, the *aula regia* of the early Norman kings, which, under the presidency of the chief-justiciar, and composed of the great officers of state and of the household, of the principal nobility, and of the justices learned in the law, attended the king's person wherever he went, and formed the sole superior court of the kingdom. But the inconvenience attending so transitory a judicature led to the demand, conceded in Magna Charta, c. 12, that *communia placita*, common pleas, should be held in a fixed place, and hence arose the establishment of the court of that name. Afterwards, under Edward I., the office of chief-justiciar was abolished, and the judicial functions of the aula regia partitioned among the Court of Chancery and the three courts of C. L. above named. In 1873, the Judicature Act. 36 and 37 Vict. c. 66, was passed, which rearranged all the Superior Courts in England, consolidating them into one Supreme Court of Judicature, but having five divisions called the High Court of Justice. Three of these divisions were called the Queen's Bench division, the Common Pleas division, and the Exchequer division, respectively. The kind of business dealt with in each division was substantially the same as under the previous arrangements, the chief difference being the new names of the courts and the principle now common to them all, that thereafter they should administer justice without distinction as to its being theretofore known as Common Law or Equity. The former distinctions existing in the jurisdiction of the courts may still be briefly indicated under the head of each court.

1. *Court of Queen's Bench.*—This court was composed of a chief-justice, who was entitled to the style of Chief-justice of England, and five puisne judges or justices. Its peculiar powers lay chiefly in the exercise of supervision over the proceedings of inferior courts and magistrates, to the effect of restraining them from exceeding their jurisdiction, or of compelling them to perform their duty, and in the control of corporations in the event of illegal procedure, and in criminal jurisdiction.

2. *Common Pleas.*—This court retained exclusive jurisdiction over real actions so long as they existed, but as they have long been abolished in favor of simpler forms which are equally available in the other courts, it held few peculiar powers. A remnant of its original authority was reserved to it in the disposal of the actions which came in lieu of the old writs of dower to this court (23 and 24 Vict. c. 126, s. 26), and in the rule that certain deeds affecting land must be registered in the Court of Common Pleas. This court was also by statute the court of appeal from the decisions of the revising Barristers (q. v.). It was presided over by a chief-justice, styled "of the Common Pleas," and there were also five puisne justices.

3. *Exchequer.*—This court possessed exclusive authority in all matters relating to the revenue. It was at one time a court of equity, as well as of common law, but the equity branch (which was always distinct) was abolished by 5 Vict. c. 5. It was composed of a chief-baron and 5 puisne barons.

The chiefs of these courts are appointed by the crown; the puisne judges, by the Lord Chancellor. The salary of the Chief-justice of Queen's Bench is £8000; that of the Chief-justice of Common Pleas, and the Chief-baron of Exchequer, £7000; and that of the puisne judges, £5000 per annum.

The Queen's bench used to sit also as a Bail Court (q. v.). The appeal formerly from those courts was to the Exchequer Chamber and thence to the House of Lords. But now the appeal is to Her Majesty's Court of Appeal in the first instance, and thence to the House of Lords. This last court of appeal consists of the Lord Chancellor and the Lords of Appeal appointed to sit as peers; and it may besides include

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those peers who hold or have held high judicial offices in England, Scotland, or Ireland.

The sittings of the above superior courts are held only during Term (q. v.) when they are said to sit *in Banc* (q. v.), and decide on all questions of law that may arise in the actions brought before them. But questions of fact, unless both parties consent to leave them to the decision of the court (17 and 18 Vict. c. 125, s. 1.), are decided by a jury, and the courts in which they are tried are held out of term-time, before one or two judges only, not necessarily of the court to which the action belongs. These trials take place either on Circuit (q. v.), or at the London and Westminster sittings, which are in or after every term, and in either case are called trials at *nisi prius*. The verdict is returned to the court to which the action belongs, by which it is disposed of according to law.

The authority of the superior courts of C. L. extends over the whole of England and over common law rights of every description. But since the remodelling of the county courts, it has been enacted by several statutes, with a view to discourage resort to such high judicatures in trifling cases, that in some species of actions in which less than £20, and in other species in which less than £5 shall be recovered, in the superior courts, no costs shall be allowed the plaintiff, unless the judge who tries the case shall certify that there was sufficient reason for its being brought in the superior courts.

The inferior courts are restricted both in respect of place and matter. They were extremely numerous, but now nearly all have been formally abolished; but they are now, with few exceptions—the principal of which is the modern County Court (q. v.)—matter of interest to the antiquary rather than either to the practical lawyer or the public. They may therefore be passed over with very brief explanation.

The *Court Baron* was a court composed of the tenants of each lord of a manor. It might decide on all real actions (now abolished) arising within the manor, and on personal actions below the value of 40*s.*, but subject to review by the court at Westminster. In a manor comprising Copyholds (q. v.), it is still of importance. The *Hundred Court* was a similar court, composed of the free-holders within the Hundred (q. v.), and had like powers with the Court Baron. The Court of *Pie Poudre*, or dusty foot, was held by the steward of a manor to which a market belongs, for the decision of all questions of bargaining at the markets. The *Forest Courts*, of several classes, were for the preservation of the beasts of the chase, and the protection of the subject from oppression by the officers of the forest. The *Courts of Request* in boroughs were for the recovery of small debts, but are now abolished.

A few *Borough Court* still exist, and are held under the presidency of the Recorder (q. v.). From them a writ of error lies to the superior courts. The *Lord Mayor's Court*, and the *City Court*, in the city of London, have a considerable amount of business. The *Court of Hustings* in London is practically obsolete. The *Court of the Cinque Ports* is held before the mayor and jurats of each port, from which error lies to the Lord Warden of the Cinque Ports Court at Shepway, and thence to the Queen's Bench. The *Stannery Courts* in Cornwall and Devonshire are also still in use, and exclude, as to the tin-workers, the jurisdiction of all other courts, except in pleas of land, life, or member. They are held before the vice-warden of the Stanneries, and appeal lies only to the warden, assisted by two of the judges; and thence to the High Court (2 and 3 Vict. c. 58, 18 and 19 Vict. c. 32, and 32 and 33 Vict. c. 19). There are in some counties also *Barmote Courts*, for regulating questions relating to the mines (14 and 15 Vict. c. 94). The Courts of the Chancellors of the universities of Oxford and Cambridge have also exclusive jurisdiction (except as regards freeholds), where the defendant is resident in the town, and a scholar or privileged member of the university is a party.

The Court of Common Pleas in Lancaster, and the Court of Pleas in Durham, have jurisdiction in all personal actions, and now form part of the High Court of Justice.

COMMON LAW BAR, that portion of the English bar which devotes itself to practice in the common law courts, distinguished from the equity bar, which practises only in the Courts of Chancery.

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COMMON LODGING HOUSES. See LODGINGS.

COMMON PLEAS. See COMMON LAW, COURTS OF.

COMMON PRAYER-BOOK. This book contains the forms of public worship and administration of the sacraments and other rites and ceremonies according to the use of the United Church of England and Ireland. It is, for the most part, a translation of such portions of the services of the ancient Catholic Church as were considered by the Reformers free from all objection. Before the Reformation, the liturgy was in Latin, and the form generally adopted in the south of England was that after the use of Sarum. The first steps towards its reformation were taken by Henry VIII., the main objects in view being the abolition of what was superstitious, and the translation of the services into the vulgar tongue. In the year 1540, a committee of bishops and divines was appointed for the purpose, and what was done by them was revised by convocation in 1543. In the year 1545, the "King's Primer" came forth, containing, amongst other things, the Lord's Prayer, Creed, Ten Commandments, "Venite," "Te Deum," Litany, and other hymns and collects in English, several of which were in the same version as at present used. It was, however, in the reign of Edward VI. that the most important steps were taken for framing a new service-book. In opposition to the practice introduced by the Roman Catholic Church, an act of parliament was passed, ordering the communion to be administered to the laity in both kinds, and a formulary was drawn up for this purpose, and used at the end of the Latin mass. In the following year, a complete service-book was drawn up, including offices not only for Sundays and holidays, but for the administering of baptism and confirmation, for matrimony, the burial of the dead and other occasions, together with the above-mentioned office for the communion considerably altered. This book was compiled by Cranmer and Ridley, assisted by eleven other divines; it was revised by convocation, and confirmed by king and parliament, and published in 1549, and is known as the FIRST PRAYER-BOOK of Edward VI. It differed from the one now in use by beginning the daily service with the Lord's Prayer, by retaining prayers for the dead, and directing the use of the sign of the cross in confirmation and visitation services, and the anointing of the sick. It was drawn up with great prudence, retaining as much, and altering as little as possible of what had been familiar to the people. In 1550, the ordination service was added, taken principally from that used by the Roman Catholic Church, but omitting certain ceremonies, and adding most of the questions proposed to the candidates. This service differed but little from that now in use, as authorised in 1662.

In 1551, objections, as might be expected, were made from various quarters to this *first* prayer-book, and Cranmer proposed to revise it, and called to his assistance two distinguished foreign reformers—Martin Bucer, and Peter Martyr. In this revision, some of the principal alterations were the addition of the opening sentences, the exhortation, confession, and absolution at the beginning of the service, the disuse of oil in baptism, of unction of the sick, and of prayers for the dead. The book thus altered was confirmed by act of parliament in 1552, and is called the SECOND PRAYER-BOOK of Edward VI.

In the reign of Queen Mary, the acts of 1549 and 1552 were repealed, and therefore, at the accession of Elizabeth, it was necessary to reverse this repeal; and this afforded a fresh opportunity of revising the whole. The question then arose (1560) as to which of King Edward's two books should be adopted. The queen herself would probably have preferred the first, as containing many of the old ceremonies to which she was attached, but the second was chosen, and a few unimportant changes introduced. This may be called the THIRD COMMON PRAYER-BOOK. No alteration was made by it as to the use of church ornaments and vestments, which were directed by the act of uniformity, 1559, to be retained as they were left by the authority of parliament in the second year of Edward VI.

On the accession of James I., after the Hampton Court Conference, the book was again revised; and a few judicious changes made, e. g., some forms of thanksgiving were added for special occasions, and the explanation of the sacraments by Dr Overall after the catechism; midwives and laymen were also prohibited from baptising. In this state, the C. P. was left until the Restoration, when, at the request of the Presbyterians, the king consented to a fresh revision, 1661. Twelve bishops were appointed to confer with an equal number of Presbyterian divines,

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each side having nine coadjutors. They were to consider the principal objections raised against the liturgy as it then stood. This was called the Savoy Conference. The Presbyterians brought forward all the objections that had been made by the Puritans for the last century, adding new ones of their own. Baxter went so far as to say that it was incapable of amendment, and was bold enough to offer an entirely new liturgy of his own composition to be received in the place of the authorised one. It is hardly necessary to add, that the conference broke up without anything being done, except that the bishops proposed a few alterations, which were adopted by convocation in 1662, and confirmed by act of parliament. Among these changes, the new authorised version of the Scriptures was adopted, except in the Psalms (which follow the version of Coverdale's Bible, and had become familiar to the people), and in the commandments and the sentences at the communion service; the general thanksgiving was added, and the form of prayer to be used at sea. It is proper to observe that the four forms of prayer known as the *State* Services—viz., for Gunpowder Treason, on November 5; for King Charles's Martyrdom, January 30; for the Restoration, May 29; and the King's Accession; were never properly a part of the C. P., but were annexed to it by order of the king in council at the beginning of every reign. Upon an address of both Houses of Parliament, in conformity with the wish of the clergy, an order in council was given by Queen Victoria for discontinuing the first three. There have been four acts of uniformity—viz., in 1548 and 1552, both of which were repealed by that of Elizabeth in 1559; and the last in the 14th year of Charles II., 1662, which left that of Elizabeth unrepealed. In the Great Rebellion, 1648, the Long Parliament prohibited the use of the common prayer-book. At the Revolution in 1688, no change was introduced into the prayer-book; for although a commission was appointed for the purpose, the second downfall of Episcopacy in Scotland in 1689 caused such alarm in the English Church that the matter was dropped.

Concerning the use of the English C. P. in Ireland, it is sufficient to say that, in 1551, the first prayer-book of Edward was introduced by the king's authority, after some opposition; and the same prayer-book continued to be used on both sides of the Channel till the Irish branch of the United Church was disestablished. In 1875, the General Synod of the Church of Ireland adopted a Revision of the C. P., but without essential alteration. In Scotland, which had as yet no settled liturgy, Laud attempted to introduce the English prayer-book, but with alterations in the communion service which were likely to be very offensive to a people so hostile to the Church of Rome. This attempt was followed by riots, and ultimately led to the abolition of the Scotch Episcopate and to the Solemn League and Covenant. The English C. P. is now used in most of the Episcopal churches in Scotland, but in some a liturgy resembling that of Laud, but framed by the Nonjurors more on the model of the Eastern liturgies, is used in the communion service. In the United States, also, the English C. P. is used with some slight changes.

COMMON SENSE, The Philosophy of. There are certain beliefs that have been current among men in all ages, which, when canvassed by one set of philosophers, have been declared to be groundless illusions. Of these, the most remarkable instance is the belief in an external, material world, independent of any mind to perceive it. The doctrine put forth by Bishop Berkeley, as opposed to the common opinion, was, that "the whole universe subsists, and can only subsist, within such a sentient, invisible, and conscious thing as the mind is known to be. In this way, each human mind must have within it a separate universe of its own, but so exactly the same in all minds, that every object of sense, and every movement of every object that is to be found in the universe of one mind, is to be found also in the universe that is within the other mind; the general effect of all which conditions is much the same as that which would be produced if several people were all dreaming, exactly at the same time, exactly the same dream." "The result of Berkeley's inquiry," says Dr Reid, "was a serious conviction that there is no such thing as a material world—nothing in nature but spirits and ideas; and that the belief of material substances, and of abstract ideas, are the chief causes of all our errors in philosophy, and of all infidelity and heresy in religion. His arguments are founded upon the principles which were formerly laid down by Des Cartes, Malebranche, and Locke, and which have been very generally received. And the opinion

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of the ablest judges seems to be, that they neither have been nor can be confuted; and that he hath proved by unanswerable arguments, what no man in his senses can believe. Hume proceeds upon the same principles, but carries them to their full length; and as the bishop nudid the whole material world, this author, upon the same grounds, undoes the world of spirits, and leaves nothing in nature but ideas and impressions, without any subject on which they may be impressed."—"Inquiry into the Human Mind," c, 1, s. 5.

A dead-lock in philosophy was the result of those doctrines of Berkeley and Hume; and the solution offered by Reid consisted in setting up C. S. as an arbiter from which there could be no appeal; that is to say, the universally admitted impressions of mankind were to be taken as corresponding to the fact of things without any further scrutiny. Reid's philosophy of C. S. has thus found a place in the thinking world; and it is only the same view otherwise expressed, when it is declared by other philosophers that the deliverance of consciousness must be presumed true. Sir W. Hamilton, in the most elaborate vindication of the C. S. philosophy that has ever been produced (edition of Reid's works), dwells largely upon this last view of the subject. The following extract is a specimen of his mode of reasoning: "When, for example, consciousness assures us that, in perception, we are immediately cognizant of an external and extended *non-ego* (not self); or that, in remembrance, through the imagination, of which we are immediately cognizant, we obtain a mediate knowledge of a real past: how shall we repel the doubt—in the former case, that what is given as the extended reality itself is not merely a representation of matter by mind; in the latter, that what is given as a mediate knowledge of the past, is not a mere present phantasm, containing an illusive reference to a real past? We can do this only in one way. The legitimacy of such gratuitous doubt necessarily supposes that the deliverance of consciousness *is not to be presumed true*. If, therefore, it can be shown, on the one hand, that the deliverances of consciousness must philosophically be accepted *until* their certain or probable falsehood has been positively evinced; and if, on the other hand, it cannot be shewn that any attempt to discredit the veracity of consciousness has ever yet succeeded; it follows that, as philosophy now stands, the testimony of consciousness must be viewed as high above suspicion, and its declarations entitled to demand prompt and unconditional assent."

"In the first place, it cannot but be acknowledged that the veracity of consciousness must at least, in the first instance, be conceded. Nature is not gratuitously to be assumed to work, not only in vain, but in counteraction of herself." "But in the second place, though the veracity of the primary convictions of consciousness must, in the outset, be admitted, it still remains competent to lead a proof that they are undeserving of credit. But how is this to be done? As the ultimate grounds of knowledge, these convictions cannot be redargued from any higher knowledge; and as original beliefs, they are paramount in certainty to every derivative assurance." "It will argue nothing against the trustworthiness of consciousness, that all or any of its deliverances are inexplicable—are incomprehensible. To make the comprehensibility of a datum of consciousness the criterion of its truth, would be indeed the climax of absurdity." (P. 745.)

The conclusiveness of this reasoning is disputed by many, who object, that consciousness (q. v.) is a very wide word, comprising indeed everything that we call mind; and it is proverbially unsafe to argue in generalities. Suppose, it is argued, we were to substitute "memory" in the above reasonings, and to maintain that the veracity of each one's memory was beyond all question or dispute, it would be apparent at once how the case really stands. In one meaning, and in one set of circumstances, memory is sure, or even, if we please, infallible—that is, when we record an observation the moment after we have made it. For a short interval of time, a simple fact, or a brief statement, may be recollected with entire certainty. On the other hand, the lapse of days, months, or years, and the complicacy of the fact, not to mention the bias of the feelings, are known to cause great uncertainty in our recollection, and in such circumstances we do not implicitly rely on it. In a word, *experience* is the criterion of how far the memory is to be trusted. Possibly, therefore, the same thing may turn out to be true of the larger fact named consciousness.

The truths of C. S., or consciousness, are such as these: the laws of Identity,

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Contradiction, and Excluded Middle (see IDENTITY); the axioms of Mathematics the law of Causality (see CAUSE); the doctrine of an innate moral sense (see ETHICS); the doctrine of man's Moral Liberty (see FREE WILL); the existence of an external world independent of every percipient mind. Such truths are designated by a variety of other names, with a view to contrast them with what we learn in the course of our education and contact with the world; they are termed Intuitions, Intuitive Cognitions, Instincts, Feelings, Beliefs, Principles, Ultimate or Primordial Elements, Truths *à priori*, Transcendental Cognitions, Truths of the Reason, &c.—"Hamilton's Dissertations," note A. The philosophy of C. S., as promulgated by Reid, bore reference especially to the denial by Berkeley of the received view of the material world—a subject which falls to be considered under PERCEPTION.

COMMON TIME, in Music, is that species of measure which contains two minims or two crotchets in a bar.

COMMONS, the dinner provided in English colleges and inns of court for their members. In the inns of court, it is provided only during term. Separate tables are appointed for the benchers (q. v.), for the barristers, and for the students and other members of the inn.

COMMONS, House of. See PARLIAMENT.

COMMUNION signifies, in ecclesiastical language, that relation, involving mutual claims and duties, in which those stand who are united by uniformity of belief in one religious body or church. To exclude from this relation and its involved rights, is to *excommunicate*. The most visible symbol of this relation being the partaking together of the Lord's Supper, that rite is often called the Communion. See LORD'S SUPPER.

COMMUNION SERVICE. See COMMON PRAYER-BOOK and LITURGY.

COMMUNISM, the name given to one class of the arrangements by which certain speculators have proposed to dispense with those laws of social and political economy which are supposed to keep society together, through the influence of the domestic affections and the spirit of competition, and to substitute in their stead a set of artificial rules for the government of mankind. The word Socialist has generally been applied to those who only propose to interfere with labor by abolishing competition and wages, leaving men to work under the influence of public spirit, and making an equal division of the produce. See SOCIALISM. The term Communist, on the other hand, has been applied to those who go a step further, and propose to abolish the relation of husband and wife, along with the system of domestic government which is founded on the parental authority. While Louis Blanc may be considered the head of the Socialists—though his ultimate aim was work according to capacity, and payment according to wants—the representatives of the Communists are Robert Owen, St Simon, Fourier, Prondhon, and Enfantin.

Although we usually consider C. an especially French fallacy, the first consistent practical teacher of it was our own countryman, Robert Owen. He published, in 1813, "A New view of Society, or Essays on the Principle of the Formation of the Human Character and the Application of the Principle to Practice"—in which he printed in large capital letters, as the key-note of his system, the following announcement: "That any character—from the best to the worst, from the most ignorant to the most enlightened—may be given to any community, even to the world at large, by applying certain means, which are to a great extent at the command and under the control, or easily made so, of those who possess the government of nations." No alarm was felt either at such a text or the comments made on it; nor did the world see what the author meant by the hint that there were special artificial means for improving the breed, as it were, of mankind, until he struck at the root of the domestic organisation, by such announcements as the following: "The affections of parents for their own children are too strong for their judgments ever to do justice to themselves, their children, or the public in the education of their own offspring—even if private families possessed the machinery (which they never do) to well-manufacture character from birth." He formed an organisation, too complex to be here detailed, by which families were to be subjected to a discipline which, that it might be perfectly uniform, should be carried out in parallelograms. Anticipating the results, he said: "These new associations can scarcely be formed before it will be discovered

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that by the most simple and easy regulations all the natural wants of human nature may be abundantly supplied; and the principal of selfishness—in the sense in which that term is here used—will cease to exist, for want of an adequate motive to produce it." He attested his reliance on the efficacy of his invention by sinking his own fortune in an attempt to build a parallelogram. It was commenced in the year 1825, at Orbiston, in Lanarkshire; but he did not meet with sufficient co-operation, and as his own funds only sufficed to build one corner of the parallelogram, it was impossible to give effect to arrangements which were fitted only for a completed edifice in that geometrical form. A considerable number of people—about 900, it is said—lived for some time in the building, little to their own advantage or that of the neighbors, who were naturally prejudiced against them, and probably exaggerated their irregularities; the building was soon deserted, and afterwards was totally obliterated. Owen had another opportunity of trying his parallelogram organisation in 1843, when "Harmony Hall" was established in Hampshire by the zealous efforts of his followers, who formed a sort of sect in England. Still his theory had, as he deemed it, anything but fair-play, since so far did his disciples depart from that absolute undeviating conformity to the "rational" system, as laid down by him, that they got tired of his incessant reiteration of it, and deposed him from his office of "President of the Congress."

Attempts to realize C. abroad were not more fortunate. Fourier's system was to be realized in "Phalanxes," each containing 400 families, or about 1800 persons. A sum of about half a million of pounds is said to have been spent in the establishment of a "Phalanstery" at Rambouillet. It failed, and the founder of the system, like Owen, attributed the failure to the scheme being but imperfectly developed. The St Simonians established a college or corporation at Menilmontant, with a "supreme father" at their head. The leaders were brought to trial by the government of Louis-Philippe, on a charge of undermining morality and religion. They were subjected to imprisonment, and not having public feeling with them, they were unable to bear up against the contumely thus thrown on them.

Communism, in the sense of having all things in common, is not to be confounded with the idea for which the communists of Paris fought in 1871 (see PARIS); that idea was political rather than social, although the same persons may often hold both doctrines. *Commune* is the designation of the lowest administrative division in France, corresponding in rural districts to an English parish or rather township, and in regard to cities, being equivalent to municipality. The communist doctrine is, that every such commune, or at least every important city commune, like Paris, Marseille, &c., should be a kind of independent state in itself, and France merely a federation of such states. This idea has taken deep hold of the extreme democrats, not only among the town populations of France, but also in Spain, and, to a less extent, in other parts of the continent. It was the very opposite idea for which the great civil war in the United States was fought and won.

COMMUTATION OF TITHES. See TITHES.

COMNE'NUS, the name of a family, originally Italian, of which many members occupied the throne of the Byzantine empire from 1057 to 1204, and that of Trebizond from 1204 to 1461. See BYZANTINE EMPIRE and TREBIZOND.—ANNA COMNENA (q. v.), who lived in the first half of the 12th c., is both of historic and literary celebrity.—DAVID C., the last representative of the imperial race in Trebizond, was executed at Adrianople in 1462, with all his family, by command of Mohammed II. The attempt which has been made to trace the descent of the Bonaparte family from a branch of the Comneni settled in Corsica, is not supported by valid evidence.

CO'MO, a city of Lombardy, Northern Italy, beautifully situated at the south-west extremity of the Lake of Como. It lies in a valley, surrounded by hills, clad with luxuriant gardens, olive-plantations, and orange-groves, with here and there an old ruin cropping out. The city is surrounded by old walls flanked with towers, the gateways by which the walls are pierced being fine specimens of middle-age military architecture. Among the principal buildings of C. are the cathedral, built of marble, and containing some interesting pictures and monuments; the town-hall, also of marble, dating from the beginning of the 13th c.; and the churches of San Fedele and St Abondio. There are also many fine mansions of the nobility in C. and its suburbs. The port of C. on the lake, is formed of two piers, each terminat-

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ing in a square pavilion, from which magnificent views are obtained. The inhabitants —including the suburbs—number (1872) 24,350, and are very industrious. The chief articles of manufacture are silk, cotton, woollens, yarn, and soap, the last article having a high reputation. By means of its port, C. carries on extensive trade in the produce of the district with Switzerland. C., in the time of Pliny the Younger, had attained to a high degree of prosperity as *Comum Novum*. With the fall of the Roman empire, C. passed out of sight until 1107, when it began to war with Milan, and in the course of twenty years was utterly destroyed by its antagonist. It was rebuilt in 1155, by Frederick Barbarossa, and remained a republic for two centuries, when it fell into the hands of the Viscontis, its history since that time being bound up with that of Milan.

COMO, Lake of (Ital. *Lago di Como*, ancient *Larius Lacus*), a sheet of water in Lombardy, Northern Italy, lying at the foot of the Lepontine and Rhetian Alps, chiefly formed by the river Adda, which enters it at its north and issues at its south-eastern extremity. The total length of the lake from Como to Riva is about 35 miles. About 15 miles from its northern extremity the promontory of Bellagio divides it into two branches, the longer of which is between 18 and 20 miles; the other branch is about 12 miles long. The three arms of the lake sometimes receive different names—the upper part as far as Bellagio being called the Lake of Bellano; the longer branch, on which the town of Como is built, the Lake of Como; and the shorter, the Lake of Lecco. Lake Como, however, is the general designation. The greatest breadth of the lake is not more than 3 miles, but throughout the greatest part of its length it is much less. The beauty of the surrounding scenery and the salubrity of the climate have made the Lake of C. the most celebrated and most resorted to in Italy, its shores being everywhere studded with fine villas. Queen Caroline once had a residence here. Numerous steamboats ply upon the lake.

COMODO', an island in the Eastern Archipelago, 35 miles in length by 16 in average breadth, lies between Flores on the east, and Sumbawa on the west, being separated from the latter by the Strait of Sapi. It is a penal settlement of the kingdom of Bima in Sumbawa. The exports are dried fish and good grinding-stones.

COMORI'N, Cape, the most southerly extremity of the peninsula of Hindustan, being, in fact, a sandy accretion to the termination of the Western Ghauts; while, on the outside of it, are a few detached rocks as a natural breakwater. The headland itself is so low as not to be visible at the distance of more than ten miles from the deck of a large ship; and, long before it can be itself distinguished, it is fixed in position, to the eye of the approaching mariner, by a conspicuous peak of the great chain behind it. Its lat. and long. are 8° 5′ n. and 77° 37′ e. Cape C. is in the protected principality of Travancore; and close to it there stands, amid a clump of trees, a village of the same name, with a few fishermen's huts, some venerated temples, and a Dutch church.

CO'MORN, properly Ko'morn, a town and fortress in Hungary, situated on the island of Schütt, at the junction of the Waag and the Danube, which is here crossed by a bridge of boats, about 50 miles west-north-west of Perth. This island is remarkable for fertility, as is, indeed, the whole surrounding district. The town, which is irregularly built, with narrow gloomy streets, contains (1869) 12,256 inhabitants, almost exclusively Magyar. The fortress was erected by Matthias Corvinus, and was restored at great expense in 1806. Its works and intrenchments extend about seven miles along the banks of the rivers, and it requires for its defence at least 15,000 men and 400 pieces of artillery. It has the reputation of being impregnable, and justified it in the Hungarian war, for the Austrians besieged it in vain from October 1848 to September 1849, and only became masters of it at last in virtue of a capitulation. It has manufactures of woollen and leather, and an active trade in corn, wine, honey, fish, and timber.

CO'MORO ISLES, a group of four islands in the Mozambique Channel, between Africa and Madagascar, in lat. 11°—13° s., long. 43°—45° 30′ e. The islands, which are of volcanic origin, are called Angaziya or Great Comoro, Anjouan or Johanna, Mayotta, and Mohilla. They are mountainous, the highest peaks rising above 6000 feet. The soil is fertile. The inhabitants, about 80,000 in number, are principally Mohammedans, but fetichism prevails to some extent. The manufactures are coarse cloths, jewellery, and firearms. The island of Mayotta was ceded to France

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in 1842, and the cession was confirmed in 1845. Here the cultivation of sugar has been encouraged. In 1865, there were produced 89,079 cwts. of sugar; the total exportations were valued at £45,859, nearly all being for sugar; the importations amounted only to £21,954. The people of Johanna find their principal employment in connection with ships calling for provisions. The trade of Comoro and Mohilla is of the same character, but these islands are not so much frequented by ships for the purpose of victualling.

COMPANIES' CLAUSES CONSOLIDATION ACT. See RAILWAYS.

CO'MPANY. See JOINT-STOCK COMPANY and PARTNERSHIP.

COMPANY, in Military Organisation, is an aliquot part of a regiment or battalion. In the British service, the companies in an infantry regiment are generally either ten or twelve, or, if there are two battalions, each has this number of companies. The arrangement is made to facilitate command and evolutions. The captains, lieutenants, and sub-lieutenants are all *C. officers*. The captain is the chief of a C., and the lieutenant and sub-lieutenant are his subalterns or assistants. The C. is further separated into two *subdivisions*, of two sections each. In round numbers, and without reference to special instances, a full C. may be considered to comprise about 100 men, a subdivision 50, and a section 25. Under the captain's superintendence, the lieutenant commands the first and second sections, the sub-lieutenant the third and fourth, with a sergeant to each section. Each C. has its own arm and accoutrement chests, and keeps its own books. A cavalry regiment is subdivided into *troops* instead of companies; the engineers and marines into companies; but the artillery corresponding term is *battery*. In the German army, a company comprises about 250 men, under a captain, who is a mounted officer, and 3 subalterns.

COMPANY, of a ship, is considered to include the whole of the persons engaged on board, and paid for specific duties—exclusive, therefore, of troops and passengers, but including naval officers as well as crew. See CREW.

COMPA'RATIVE ANA'TOMY. See ANATOMY.

COMPA'RISON, in Grammar, and as applied to Adjectives (q. v.), is that which marks the *degree* in which the quality is attributed to the object, as compared with other objects. There are three degrees of comparison. The *positive* indicates the quality generally, without comparison; the *comparative*, a higher degree of the quality than is attributed to other things; and the *superlative*, the highest degree that is attributed to any of the things under consideration. There are two ways of expressing these degrees. 1. By an inflection or change on the word; as, *hard, harder, hardest; happy, happier, happiest*. This mode prevails almost exclusively in Greek and Latin. 2. By an additional word, as *more happy, most happy*. This may be called logical C.; the other, grammatical. In French, with the exception of a few irregular adjectives, all adjectives follow the logical method. In English, the logical method is preferred in every case where the grammatical would produce a word difficult or harsh in the pronunciation. This is generally the case in English when the simple adjective is of more than one syllable; but it is not always so. Thus, *earnester, prudenter*, would make harsh combinations; not so *politer, discreeter, happier*. The difference is, that in *earnester, prudenter*, the accent being on the first syllable, two unaccented syllables of discordant character are thrown together; in *politer, discreeter*, the unaccented syllables are separated; and in *happier*, though they come together, they are of a kind readily to coalesce. Thus, the laws of euphony—which mean, the ear and organs of speech consulting their own convenience—determine this point, as they do much else in language. In general, it is only adjectives of quality that admit of C.; and even adjectives of quality cannot be compared when the quality does not admit of degrees; as, a *circular* space, a *gold* ring, a *universal* wish.

Adverbs (q. v.) are compared exactly like adjectives.

CO'MPASS, Mariner's, is the name given to the instrument by which sailors are enabled to steer their course on the ocean out of sight of land, and when neither sun nor stars are visible. The ancients, to whom it was unknown, could seldom venture to lose sight of the coast. The directive power of the magnet seems to have been unknown in Europe till late in the 12th century. It appears, however, on very

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good authority, that it was known in China, and throughout the East generally, at a very remote period. The Chinese annals indeed assign its discovery to the year 2634 B. C., when, they say, an instrument for indicating the south was constructed by the Emperor Hou-ang-ti. At first they would appear to have used it exclusively for guidance in travelling by land. The earliest date at which we hear of their using it at sea is somewhere about 800 A. D. According to one account, a knowledge of the C. was brought to Europe by Marco Polo, on his return from his travels in Cathay. It was long contended that the C., as a nautical instrument, was first invented by Flavio Gioja, a native of Amalfi, about the year 1302; and that that part of the kingdom of Naples where he was born has a compass for its arms. For this there is no authority whatever, as the C. was well known as a nautical instrument before his time. It is probable, however, that Gioja may have made some improvement in the instrument or in the mode of suspending it. See "British Annual for 1837.

The essential part of the C. is the magnetised needle, balanced freely upon a fine point; such a needle has the property of arranging itself in the meridian, one end always pointing to the north, and the other to the south (see MAGNETISM); yet not exactly, but with a deflection or *declination* (q. v.), which varies from time to time in magnitude, and may be towards the west or the east. The form of the needle is various, some being long, flat prisms, others lozenge-shaped. The centre of the needle is pierced, and a piece of agate generally inserted, with a conical hole sunk in it, to receive the fine point of the steel pin, so that the free motion may not be hindered by friction. The construction of the rest of the instrument depends upon the purpose it is to serve. For a mariner's C., the needle is fixed to a circular card, on which there is a star of 32 rays, marking the 32 *points* of the heavens. The north point of the card is immediately over the north end of the needle, and the card moves with the needle. The cardinal points are marked with the letters n., s., e., w.; and the intermediate-points by a system of notation. The points are often subdivided into quarters, which are thus marked: n.¼e.; (read, "north one-fourth east"); n.¼e.; n. by e.¼e., &c. A point of the C., being $\frac{1}{32}$ of the circle, is equal to 11° 15'. The C. thus formed is enclosed in a cylindrical brass box; and in order that the C. may remain horizontal in all positions of the ship, the box is suspended by Gimbals (q. v.). The whole is then placed in the Binnacle (q. v.), in sight of the helmsman. Inside the box, in the direction of the ship's bow, is a vertical black line called the *lubber-line*, and the steersman must keep the point of the card which marks the prescribed course always in contact with the black line. Compasses differing in some respects from the mariner's C. are also used in surveying and land-measuring; and for the miner they are perhaps as necessary as for the sailor.

The great difficulty connected with the use of the mariner's C. arises from the disturbing influence of the magnetism of the ship. This difficulty is particularly felt in iron vessels, where the deviation of the needle is frequently so considerable as to render the compass almost useless. Various means of obviating this have been suggested; one of these is to place bars of soft iron or magnets in the immediate neighborhood of the binnacle, which being so placed as to cause a contrary disturbance to that of the iron of the ship, leave the needle comparatively free. This is found to answer well in iron ships plying between British and continental or North American ports; but where, as in the Australian passage, they change considerably their latitude, such an arrangement is found to be worse than useless, as the magnetism of the vessel changing with the magnetic latitude, causes an ever-varying deviation of the needle. It has likewise been suggested to place a compass as a standard at the mast-head, where it would be comparatively free from the attraction of the vessel, by which the ship's course might be shaped, the ordinary C. being used merely to give immediate direction to the steersman. In the royal navy, this error is to a large extent obviated in the following way. A C. is placed so high above the deck as to clear the bulwarks, and allow the bearings of a distant object on shore or a heavenly body to be taken while the ships head makes a complete circuit. In this way, the deviation caused by the iron of the ship in all different positions may be ascertained, and afterwards taken into account.

COMPASSES, instruments for transferring and marking off distances, or for drawing circles, ellipses, &c. The *common C. or dividers* are simply two rods or

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"legs" joined together at one end by a pivot-joint, and pointed at the other; when used for drawing circles, the lower part of one of the legs is replaced by a pen or pencil. *Spring dividers* are much in use by workmen; in these, the legs are united by a strong steel spring, the action of which is to stretch them open; but half-way down, a screw passing between the legs, regulates the degree of opening. The value of these depends upon the permanency with which they retain any degree of opening given to them, pivot C. being liable to slip.

Beam C. consist of points sliding on a long bar, to which they may be clamped at any distance from each other. They are used for greater openings than pivot C. can safely span, and, when delicately made, for more accurate dividing. See GRADUATION.

Proportional C. have a point at each end of each leg and the pivot between, thus forming a double pair of C. opposite to each other, end to end. If the pivot is midway between the points, the opening of each pair of points will be equal; if the distance from one pair of points be double that from the other, the openings will be as two to one; and so on for any ratio. When a single fixed proportion only is required, the pivot is fixed accordingly; but to adapt them for variable proportions, the pivot is a clamping screw, which moves in an elongated interval in the legs, and may be fixed at any point.

Triangular C. have three legs, so that the points of a triangle may be all transferred at once.

Calliper Compasses. See CALLIPERS.

COMPA'SSIONATE ALLOW'ANCE is an allowance made to the children of deceased British military and naval officers left in necessitous circumstances. The annuities vary from £8 to £20 a year, according to the rank of the deceased officer; and are tenable up to the age of 18 in the case of boys, and to that of 21 as regards females, or until marriage if that happen earlier. This measure is more general than a C. A. which arose out of the sympathy of the British nation with the army during the Crimean War. Royal warrants were issued in 1855 and 1856, defining and explaining allowances made to the widows and children, or other specified relations, of military officers, who, after the date of the declaration of war with Russia, had been killed in action, or had died of wounds received in that war. The claims on this fund die out as years advance, of course.

COMPENSA'TION (Lat. *compensatio*). The doctrine of C., which the law of Scotland and of most of the other states of Europe have borrowed from the civil law of Rome, corresponds to that of *set-off* in England. It provides that where two parties are mutually debtors and creditors, their debts shall extinguish each other, if equal, and if unequal, leave only a balance due. C. must be pleaded, as it does not operate *ipso jure*, but, when pleaded, it is held to operate from the period of concourse, the interest on either side being stopped from that time.

Compensatio Injuriarum is a defence against actions of damages for slander or the like. It is not a bar to action, but a *set-off* or counter-claim. In England, it is not allowed to set-off one trespass or tort against another—a cross-action is requisite; and in Scotland the leaning recently has been in the same direction.

COMPENSATION OF ERRORS, in Physics, a method of neutralising errors which cannot be avoided, by introducing others into the experiment or observation, of an opposite nature, and equal in amount. The compensation pendulum illustrates the principle. See Pendulum.

COMPETI'TION (Lat. a seeking together) has been well defined by Dr Johnson as "the act of endeavoring to gain what another endeavors to gain at the same time." Its most apt exemplification is a race, where all are going to the same point, and all strive to be first there, while though only one can achieve this object, some others will have the satisfaction of being nearer to success than the competitors who are behind them. The most important practical use of the word C. is in the political economy of commerce, where it is the great motive-power of production and enterprise. People work, or embark in trade, avowedly for the purpose of making money. It is the object of the law of the land, as well as of religion and morality, to prevent money-making by immoral means; but within the bounds thus drawn around it, money-making is the object of man's exertion. When the money

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is made, the next point, always within the same bounds, is to make it go as far as it will. C. works through the co-operation of these motives. The purchaser wants the best article he can get at the lowest price; the producer strives to beat all his fellows, and offer the best article for the price. So thoroughly is this principle established as one consistent with commercial morality and honor, that our railway companies, managed by men of rank and fortune, many of whom are members of the Legislature, do not hesitate to make travellers pay a larger fare for going 20 miles on their line to a station not touched by a rival company, than they will charge the same passenger for a journey of 40 or 50 miles, if it be to a station which he could reach otherwise.

Whatever may be hereafter accomplished, what we chiefly know of the attempts to supersede C. by some other motive to exertion, is, that they have not been successful. We see every day C. increasing the necessaries and comforts of life, and enlarging the wealth of the community. It is said that there are other and better motives which should produce the same effect, but they have not yet been found. It was an object of the ruling party in the French provisional government of 1848 to abolish C., and place all workmen on a par, as some expressed it, or, according to others, to remunerate them, not according to their services, but according to their wants. A great experiment was tried at the Hôtel Clichy, where 1500 tailors were employed to make the uniforms for the national guards, the price of which was to be equally divided among the workmen; but even in that climax of enthusiasm, they did not work up to the mark of the lowest paid of the Paris tailors under the competitive system. As each one felt that the value of any extra exertion would be divided among the whole 1500, instead of being enjoyed by himself, his zeal relaxed, and even the thought of "liberty, equality, and fraternity" was insufficient to rouse it. It appears wonderful that large bodies of the French people should have been so easily deceived by statements of which the fallacy, or rather the actual inaccuracy, would be at once seen through by any working-man in this country. Louis Blanc supposes three competitors for a job. A has a wife and family; he wants 3 francs of wages. B has a wife only; 2½ francs will do with him. But C is a bachelor, who can subsist on 2 francs; therefore, he gets the job, and the others starve. See the second chapter of his "Organisation du Travail," the title of which is, "Competition is for the People a System of Extermination." But he leaves out entirely one side of the bargain. Employers compete to get work as much as workmen compete for employment. If the work of B and C be worth, in the market, 3 francs, they will get that, whether they have families or not; and it is not the practice of a working-man, any more than of the rest of the human species, to give his work at a third less than its value because he is a bachelor. The Socialists have referred to the public departments—especially to the post-office arrangements in Britain—for instances of services performed without competition. There is, however, in reality much C. in all the government departments. Although tradesmen may not endeavor to undersell each other by making goods and offering them to the government, yet they endeavor to undersell each other by offering to undertake contracts at the lowest price. Doubtless, the practice of entering on government-contracts is open to abuse, if the officers who look after them are careless, and neglect the detection of fraud or inefficiency. But the service of government by contract may be made as effective as any other kind of competition.

There are circumstances in which it is necessary to dispense with the external form of C., but where its influence still rules. For the convenience of the public—especially of travellers—rates of fares are established for cab-drivers, porters, ferrymen, and the like. These men cannot be forced to undertake such functions: they do so because it pays them. Instead of making a separate contract for each job—an arrangement open to fraud and inconvenience—they make a general bargain with the public to serve all-comers. The rate of remuneration they receive ought to be the closest possible approximation to what C. would fix. Whether it is so or not, can be easily tested. If men do not come forward in sufficient numbers to serve the public, then the fixed rate is too low; on the other hand, if there is a superfluity of hands, a percentage of them being at all times unemployed, it is clear that the rate is too high, and that even partial employment in the line is sufficient to induce men to leave other occupations.

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One of the most plausible arguments against free C. is, that it throws away labor by producing more goods than are required. Five hundred hats are wanted, but a thousand are produced, and therefore half of them are wasted. In some such shape, the folly and waste of C. are generally illustrated by continental writers. It is very rarely that dealers are so utterly blind to the demand for the article in which they trade. It must be admitted, however, that C., like all other useful things, has its peculiar abuses, and of these perhaps the chief is the propensity which some tradesmen have to carry rivalry to the extent of vicious excitement, and to endeavor rather to get the better of each other than to make their separate fortunes. From this spirit, it frequently happens that when one man has established a successful business in some new locality, another, instead of trying a different business in the same place, or the same business in some other and similar place, sets himself down as a rival, and ruins both. One sets up, for instance, a grocery-shop in a new suburb; he succeeds, but there is not business enough for two; and if a rival sits down beside him, both are ruined; whereas the success of the grocery should rather have hinted that a butchery or a bakery might have a good chance in the same place, or a grocery in some other suburb of similar character. Speculators in omnibuses and other horse-hired vehicles are signally liable to this sort of rivalry, often seeming unable to endure the sight of a brother of the trade driving a good, quiet, tolerably paying business.

C. for public offices—that is to say, the appointment to them of those young men who have shewn the highest proofs of ability according to certain tests—has so recently been adopted, that there is little opportunity of judging of its effects. But it must be kept in view, that this is something quite different from the kind of C. referred to above. Clever men may be secured to the public service by such a test, but it is clear that the motive for these clever men, as well as other public servants, doing their duty, must be something in the shape of promotion or otherwise, which will have a constant influence on them after they are appointed. See EXAMINATIONS FOR THE PUBLIC SERVICE.

COMPIÈGNE, a town in France, in the department of the Oise, stands on the river Oise, a little below its junction with the Aisne, and 38 miles east-south-east of Beauvais. A fine stone-bridge crosses the river at this point. The town, which irregularly built, has a tribunal of the first instance, and one of commerce. The inhabitants, numbering (1872) 10,353, are employed in hosiery, rope-making, boat-building, and in traffic in wood and corn. But what best deserves observation at C. is the magnificent palace, built anew by Louis XV., and splendidly fitted up by Napoleon, who often occupied it. It contains a library, a picture-gallery, and other objects worth seeing. The park is extensive, and adjoining the gardens is the beautiful forest of Compiègne, extending over about 30,000 acres. C. is mentioned in the times of Clovis under the name of *Compendium;* and it was the seat of several political assemblies and ecclesiastical councils. It was at the siege of this town, in 1430, that the Maid of Orleans was captured; and here, in 1810, Napoleon and Maria Louisa of Austria first met, on occasion of their marriage.

CO'MPLEMENT is that which completes or makes up a given magnitude to some fixed magnitude. It is most commonly used in mathematics, to signify the arc or angle by which a given arc or angle falls short of a quadrant or right angle: thus, the C. of an arc of 60° is one of 30°; and that of 30° is one of 60°.—The arithmetical C. of a number is the number by which it falls short of the next higher number expressible by tens: thus, the arithmetical C. of 64 is 100 — 64 = 36.

COMPLEMENT, in Music, the quantity required to be added to any interval to complete the octave; for example, a fourth is the C. of a fifth, a third is that of a sixth, &c.

CO'MPLINE. See CANONICAL HOURS.

COMPO'NÉ, or Gobony, in Heraldry. When a bordeur, pale, bend, or other ordinary, is made up of two rows of small squares, consisting of alternate metals and colors, it is called componé.

COMPO'SITÆ (called by Lindley ASTERACEÆ, and by some botanists SYNANTHERÆ), a natural order of exogenous plants, distinguished by *compound* or *composite flowers*, i. e., heads of flowers which are composed of a greater or smaller

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number of florets (generally of small size) congregated upon a common receptacle, and surrounded by bracts which form a leafy or scaly involucre, so as to resemble single flowers, which name they ordinarily receive. Another very marked characteristic is, that the anthers of each floret cohere into a cylindrical tube. The order contains both herbaceous plants and shrubs; those which are natives of cold climates being generally herbaceous, and those found in warm regions shrubby, or even arborescent. They have alternate or opposite leaves without stipules. The florets are either unisexual or hermaphrodite—those of the circumference (or ray) often differing in this respect, as well as in form and color, from those of the centre (or disc) of the same head. Bracts (*paleæ*) are often interspersed with the florets upon the receptacle. The calyx is superior, closely adhering to the ovary, and essentially united with it, and afterwards with the fruit, its limb either obsolete or membranous, crowning the ripened fruit, often divided into bristles, hairs, and feathers, which form a PAPPUS (q. v.). The corolla is of one petal, superior, either strap-shaped or tubular, both forms often appearing in different parts (ray and disc) of the same flower (or head) sometimes 2-lipped, very often 5-toothed. The stamens are equal in number to the teeth of the corolla, 4 or 5, and alternate with them. The ovary is 1-celled, with a single erect ovule; the style simple, with 2 stigmas; the fruit dry and not opening (see ACHENIUM): the seed destitute of albumen.—This is the largest of the natural orders of flowering-plants, containing upwards of 1000 genera, and almost 10,000 known species. They are distributed over all parts of the world; but increase in number from the poles to the tropics, and thence, again, diminish towards the equator. In the Linnæan sexual system, they form a distinct class, SYNGENESIA. Jussieu subdivided the order into three sections, and although other subdivisions have been proposed, these are generally recognized as sub-orders—CYNAROCEPHALÆ, having the florets all tubular; CORYMBIFERÆ, having a disc of tubular florets, surrounded by a ray of strap-shaped florets; and CICHORACEÆ, having all the florets strap-shaped. The *Cichoraceæ* abound most in cold, and the *Corymbiferæ* in warm climates. The Artichoke and Thistle are familiar examples of the *Cynarocephalæ*; the Daisy, Aster, Dahlia, Chrysanthemum, Chamomile, and Sunflower of the *Corymbiferæ*; and the Dandelion, Chicory, and Lettuce of the *Cichoraceæ*. By cultivation, many of the *Corymbiferæ* are changed so that the florets of the disc assume the same appearance with the florets of the ray, as may be seen in the Dahlia, Chrysanthemum, Aster, &c., and they are then said to be double, although the change which they have undergone is very different from that which has taken place in double flowers of other kinds. The C. are not, in general, of very great importance in domestic economy or in the arts, although many of them are among cultivated and useful plants. Only a few, as the Artichoke, Scorzonera, Salsafy, Jerusalem Artichoke, Endive, and Lettuce, are used for food, and these are of inferior importance in that respect. A very few, as Safflower and Saw-wort, afford dye-stuffs; and a very few, as the Jerusalem Artichoke and Chicory, are occasionally cultivated for food of domestic animals; the use of chicory-root as a substitute for coffee is well known. From the seeds of some, a bland fixed oil is expressed—the Sunflower, Madia, and Ram-til being the most important. Many are valuable for their medicinal properties, as Chamomile, Arnica, Wormwood and some other species of Artemisia, Elecampane, Tussilago, Blessed Thistle, &c. Many are characterised by bitterness; stimulating properties are of frequent occurrence; also anodyne, diaphoretic, diuretic, and narcotic properties. Some, as Arnica, are very poisonous. A large number are esteemed ornaments of our flower-gardens, particularly in the latter part of summer and in autumn. Amongst these, the Dahlia perhaps holds the first place; and others, scarcely less admired, belong to the genera Aster and Chrysanthemum. The wood of the Sirlehout (*Tarchonanthus camphoratus*), a small tree of the Cape of Good Hope, is close-grained, heavy, and very beautiful.

CO'MPOSITE O'RDER, in Architecture. See COLUMN.

COMPOSI'TION, in Art, signifies such an arrangement of the separate objects represented as that they shall all manifestly tend to bring out the centre thought or idea which animates the whole. Episodes and digressions are less admissible in æsthetic works of art than in poetry, and less in plastic art than in painting. In all works of art, it is to be borne in mind that the story is to be told to and apprehended by the eye alone. There is no surer proof of failure in æsthetic C. than when a

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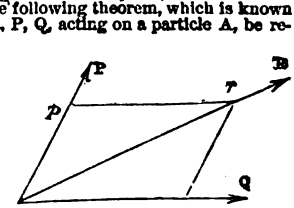
picture is found to be totally unintelligible, even to intelligent persons, without the aid of a description in a catalogue. Rules are of little or no avail in this matter. There is but one canon of universal application—viz., that the artist should in the first place make it clear to his own mind what his work is to express; and that he should then consider by what arrangement of the objects that must or may be introduced into the picture, this will be best accomplished.

COMPOSITION, in Bankruptcy, a certain sum per pound which creditors agree to receive from a bankrupt in lieu of full payment of his debts, and the acceptance of which operates as a discharge to the bankrupt and reinvests him in his estate. In Scotland the acceptance of a C. bill, unless the contrary be stipulated, only entitles the creditors to rank for the C., and not for the full amount in the event of a second bankruptcy. If no C. bill be accepted, and there be no accession to a C. contract, it has been held that the creditor may in a second bankruptcy rank for his full debt. In a Scotch sequestration, the bankrupt must find security for payment of the C. to the satisfaction of a certain proportion in number and value of the creditors, which proportion varies according to circumstances. The cautioner is only bound for two years, but recourse against the bankrupt is unlimited. The English Bankruptcy Acts give facilities to debtors to compound with their creditors, and to compel minorities to agree to the C.; but all must be called together, and the proceeding goes through stages analogous to a regular bankruptcy.

COMPOSITION AND RESOLUTION OF FORCES AND MOTIONS. 1. The fundamental problem in statics is to find the magnitude and direction of the *resultant* of two forces; in other words, to compound them into a single force, which shall be in every respect their equivalent. Intensity and direction being the only elements necessary to entirely describe a force, forces in statics are represented by lines, which are obviously capable of being made to represent them both in magnitude and direction. When two forces act along the same straight line on a particle, it is sufficiently obvious that if they act in the same direction, the resultant will be their *algebraical* sum; if in opposite directions, their *algebraical* difference. This being premised, the relation between two forces acting at the same point, but not in the same line, and their resultant, is set forth in the following theorem, which is known as the *Parallelogram of Forces:* If two forces, P, Q, acting on a particle A, be represented in direction and magnitude by the lines A*p*, A*q*, then the resultant will be represented in direction and magnitude by the diagonal A*r* of the parallelogram described upon A*p*, A*q*. The proof of this depends upon the simple principles that a force may be supposed to act at any point of its direction, that point being conceived to be rigidly attached to the particle on which the force acts; and what may be accepted as an axiom of universal experience, that when any number of forces are impressed on a particle or body, each exerts itself, as if the others were not acting, to produce its full effect. See any elementary treatise on Mechanics. The doctrine of the parallelogram of forces has given rise to much controversy, not as to its truth, but as to its derivation, some appearing to contend that it is directly deducible from the axiom above stated, without the necessity of further reasoning.—Knowing how to compound two forces acting at a point, we are able to compound or determine the resultant of any number. If the forces, though in the same plane, do not act at the same point of a body, those of them whose directions meet may be compounded by the preceding rule; if they are parallel, their resultant is a force parallel to them and equal to their algebraical sum, counting those acting in one direction as positive, and in the opposite direction as negative. For the position of the resultant in this case, see PARALLEL FORCES. The singular case is that of equal parallel forces acting in opposite directions. These constitute a couple, and cannot be represented by any single force. See COUPLES.



2. The resolution of forces is the converse problem. To resolve a given force R, whose direction and magnitude is A*r*, into two forces acting in any directions that

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may be chosen, as AP, AQ, we have only to draw parallels through r, which determine the lines Ap, Aq, representing the magnitude of the forces required. It is evident that there is an indefinite number of pairs of forces into which Ar might be resolved, according to the direction in which the new forces are to act. It is usual, however, to resolve a force into forces that are at right angles to each other.

3. The composition of motions is analogous in every way to that of forces; motions are the results of forces, and the analogy might be expected. If a body be actuated simultaneously by two velocities having different directions, it will evidently move in a direction intermediate to the two, and with a velocity which will in some way depend on each of them, and which is called their resultant. The proposition which sets forth how to find the resultant, is called the *Parallelogram of Velocities*. It is: If two velocities, with which a particle is simultaneously impressed, be represented in direction and magnitude by two straight lines drawn from the particle, the resultant velocity of the particle will be represented in direction and magnitude by the diagonal of the parallelogram described on those two straight lines. The proof is very simple. There is no reason why the full effect of both velocities should not be produced, as if the body moved first with one of them, and then with the other in their respective directions. If in one *second* the body moving with the one velocity would reach p, and if we suppose it then to move on pr for another second, parallel with the other velocity, it would at the end of the second second be at r. Hence, under their joint influence, it will be at r at the end of one second.

4. The resolution of motions is altogether analogous to that of forces.

COMPO'SITOR. See TYPE.

COMPOS MENTIS. See INSANITY.

COMPOSTE'LLA, Military Order of St James of. St James, the elder, was adopted as the patron saint of Spain, after the victory of Clavijo, and his relics were preserved at Compostella, the capital of the province of Galicia. The marvels supposed to be performed by these relics, drew vast numbers of pilgrims, for whose support hospitals were established by the pious canons of St Eloy. The vicinity of the Moors having subsequently rendered the high-roads unsafe, thirteen noblemen united for the protection of the pilgrims, and, in conjunction with the canons, resolved to found an order of the same kind as that of the Hospitallers or Templars. The pope granted his assent in a bull, dated 5th July 1175, accompanied with the statutes of the order. Whatever conquests were made from the infidel were declared the property of the order, and a council of thirteen knights was vested with authority to elect and depose a grand master. The knights made vows of poverty, obedience, and celibacy, and professed their belief in the immaculate conception. To protect Christians, and convert infidels, they vowed to be the only object in their wars with the Saracens. In most of the great battles between Christian and Moor, the red cross of the order was conspicuous. The conquests of the order itself, combined with the grateful munificence of the nation, speedily increased its wealth and power beyond those of any of the other orders of knighthood. In addition to the three large commanderies of Leon, Castile, and Montalvan, it possessed nearly 200 minor commanderies, comprising, it is said, more than 200 priories, with many fiefs, cloisters, hospitals, castles, boroughs, two towns, and 178 villages, exclusive of its possessions in Portugal. This enormous wealth and power of the order excited the jealousy of the crown, in which, in 1522, the grand mastership was permanently vested by the pope. Having thus become merely honorary and dependent on the crown, the order rapidly decreased in importance.

CO'MPOSTS are a kind of manure (q. v.), consisting of mixtures of substances adapted to the fertilisation of the soil, which being allowed to ferment, and undergo chemical changes for a considerable time in heaps, become more valuable than they were at first, or ever could have been if applied separately. C. were formerly made of farm-yard manure, and earth or lime in addition. Road-scrapings, peat-moss, leaves, and clearings of ditches, also formed materials for the purpose. By allowing these to lie in heaps for six months, of from three to four feet in depth a food was prepared for plants. The mass was usually applied to the turnip-crop, and when artificial manures were unknown, considerable benefit arose from such dressings. The use of guano and other light manures has superseded in a great measure the necessity of this laborious process, and C. for the turnips or barley

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crops are now little used. The wonderful effects that have resulted from the application of small doses of nitrogen and phosphoric acid, have impressed farmers in general with the truth, that the most energetic elements bear a small proportion in weight to the whole mass of farm-yard dung or C., and that the mixing of manures in heaps with earth does not so much add to its virtues as to repay the labor expended in the process. More care is now rightly bestowed in preserving manure from washings by rain. C. formed of leaves, ditch-scourings, road-scrapings, or any earthy matter containing a large percentage of vegetable matter, with the addition of lime, may still be used with benefit for pastures that are deteriorating, or where the soil is stiff. Where moss prevails, lime should enter largely as a component. On the other hand, where the soil is of a strong and clayey nature, earthy substances containing vegetable matter in larger proportions should be used. Vegetable matter has the effect of imparting a softness to the surface, that is particularly conducive to the free growth of pastures. Compost made of turf, leaves, earth, and bone-dust is used with great benefit by gardeners for vines and fruit-trees which are injured by too concentrated manures.

CO'MPOUND A'NIMALS are those animals, exclusively of the lowest classes, in which individuals distinct as to many of the powers of life, are yet united in some part of their frame, so as to form one living system. Examples of this union are found in many animalcules and zoophytes, also in cestoid worms and ascidian mollusks. The whole living system in all C. A. appears to originate from a single egg or germ, and each is at first simple; the subsequent multiplication of individuals, having distinct organs, but permanently retaining their connection with the system, has some analogies with some of the modes of true reproduction. It is important, also, to observe that many C. A. exhibit very close relations to other animals which in no degree possess this remarkable character. The subject of C. A. is in many respects an extremely interesting one. This occasional peculiarity in animal life may perhaps be regarded as affording some countenance to the theory of Darwin concerning plants, that each bud is to be accounted a distinct individual. But the term individual must be modified in its sense, when applied to the buds of a tree, or the polypes of a polypidom.

COMPOUND COMMON TIME, that species of measure containing the value of two dotted minims in a bar, or two dotted crotchets.

COMPOUND INTEREST. See INTEREST.

COMPOUND TRIPLE TIME denotes a measure of nine crotchets or quavers in a bar.

COMPOU'NDING OF FE'LONY, in England, is the offence of taking value for forbearing to prosecute a felony, and is punishable with fine and imprisonment. Compounding of informations upon penal statutes, and compounding of misdemeanors, are also illegal, unless with leave of one of the courts at Westminster, and are punishable in a lighter degree. But in misdemeanors affecting many private (and not public) rights, the court will often permit the defendant to make the prosecutor some pecuniary amends, and thereupon withdraw the prosecution. A species of C. of F. is the advertising a reward for stolen property, coupled with words implying that no questions will be asked, or that no prosecution will be instituted, or that a pawnbroker returning the property will be paid what he has advanced for it; and this offence, by 24 and 25 Vict. c. 96, s. 102, is punishable by a fine of £50 on the advertiser, publisher, and printer. And whosoever shall take money or reward for restoring a stolen dog is liable, by 24 and 25 Vict. c. 96 s. 29, to imprisonment for eighteen months.

COMPRE'SSED-AIR BATH, a large chamber in which patients sit under increased atmospheric pressure for a greater or shorter period. An attempt at this kind of treatment was made as early as 1662 by Dr. Henshaw, but failed, owing to the imperfection of the apparatus. The apparatus, as now used, is the invention of M. Emile Labonrié of Paris, who in 1832 conducted a series of careful experiments upon the effects of the atmospheric air at different densities upon the human frame. The bath is a chamber 9 feet in diameter, and 13 feet high; it is constructed of iron plates rivetted together like those of a boiler of a steam-engine, so as to be perfectly air-tight; it is provided with two close-fitting iron doors, which can be opened

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without affecting the pressure of the air within the chamber; the interior is lined with wood, and furnished with seats; a steam-engine of seven-horse power works a pair of large air-pumps, communicating indirectly with the chamber by a pipe that opens by means of numerous small holes in the bottom of the floor, so that the air enters imperceptibly into the chamber; from the roof, a pipe similarly arranged allows the breathed air to escape. Each of these tubes is supplied with a screw valve, by means of which the inlet and exit of the air are regulated. Two barometers hang on the walls of the chamber, to shew the rate of increase and decrease of pressure. The pressure is raised at the rate of 1 lb. every 4 minutes, and the lowering takes place at the same rate. The pressure is usually raised to 7 lbs. per sq. inch, in addition to the usual pressure of the atmosphere. The period generally prescribed for remaining in the bath is two hours.

The diseases in which the C. B. is said to be most efficient are phthisis, asthma, and chronic bronchitis. The effects are attributed to two causes: 1. A greater quantity of air, and consequently of oxygen, is inhaled in a given time; and not only so, but the amount absorbed is increased in proportion to the pressure of the gas against the walls of the air vesicles. The increased absorption of oxygen and excretion of carbonic acid enables the lungs to perform their functions more efficiently, and thereby removes any congestion existing in these organs. 2. The increased mechanical pressure of the air upon the mucous membrance, when in a state of chronic congestion, has a bracing effect, and imparts renewed vigor to the entire structure of the lungs and bronchi. At Ben-Rhydding, the C. B. is used in cases of the kind above named, along with the usual appliances of the water-cure.

COMPRESSED AIR-ENGINE. One mode of employing air as a motive power is described in CALORIC ENGINE (q. v.). Another obvious way is to compress it, and then apply it in the manner of high-pressure steam. Although compressed air has been used for working small engines in confined situations, such as Tunnels (q. v.) it is not at all likely that it will ever come into extensive use, owing to the great waste of power attending it. This waste arises from two causes—first, the friction due to forcing the compressed air along a great length of pipe; and secondly, the loss from the dissipation of the great heat which results from its compression. If, say, 100 cubic feet of air is compressed into 1 cubic foot, it will become very hot, and although it is very easy to keep in the air, it is impossible to keep in the heat. In spite of every precaution, the heat will find its way through the vessel in which the air is confined, and through the pipes in which it is being transmitted, and this is equivalent to a portion of the air itself leaking out, because, when the air is permitted to expand in working the engine, it will not attain the bulk it originally had of 100 cubic feet. The greater the original compression of the air, the higher its temperature will rise; and as this caloric, which cannot be kept from escaping, is practically a part of the bulk of the air, it follows that the loss of power from this cause will increase with the pressure or tension of the air. Even were it possible to prevent the escape of the heat by covering the vessels and pipes with some non-conducting substance, it would not be practicable to use the hot air in the same way as steam is used, because the lubricating material necessary to keep the piston and slide-valves from "tearing" would be decomposed by the high temperature. In steam-engines, there is always a small quantity of water in the cylinders and slide-valves, arising from the condensation of a portion of the steam, and this suffices to lubricate the piston and valves. It is well known that when steam is *superheated* so highly as to prevent a slight condensation in the cylinder and slide-valves, they are very rapidly destroyed. Air rises in temperature when very much compressed, and we cannot use it until its temperature falls; and as this involves a great waste of power, it follows that where economy is of any consequence, air cannot be used as a mode of transmitting mechanical power. Indeed, no fluid can be economically used for transmitting power for any great distance. We have just seen that compressed air is very unsuitable; steam is even more wasteful, because it condenses into water in long pipes. Water itself loses much of its force from friction in passing through long pipes, unless they are of very large size; and in applying it to working Hydraulic Cranes (q. v.), where the weight to be raised varies, great waste of power arises from the fact, that the cylinder in which the ram works, has to be filled every time the crane is worked with water at the full pressure of 600 or 700 lbs. to the square inch, even when a pressure

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one-tenth of that amount would suffice to raise the weight. In short, the power actually used in working a hydraulic crane is always the maximum, even when the weight to be raised is a minimum. It *uses* as much power to lift a hundred-weight as it does to lift a ton. The extreme handiness and other practical advantages possessed by the hydraulic cranes leave a large balance in their favor, notwithstanding their waste of power.

In boring the Mont Cenis Tunnel (see TUNNEL), air was compressed at the mouth of the tunnel by the abundant water power easily obtainable there, and forced along to the working face through small iron pipes, for working the boring-machines. General Haupt, an able American engineer, who has been engaged in some extensive tunneling operations in the United States, has proposed a plan for using ordinary steam boilers and engines close to the working face in the tunnel, and drawing out the smoke and vitiated air through a wooden trunk, by means of a large fan at the mouth of the tunnel. This scheme offers the very great advantage of having to deal only with air and smoke under pressure differing but little from that of the atmosphere. A wooden trunk of no great strength, and involving little difficulty in keeping it sufficiently air-tight, would take the place of strong cast-iron pipes, which require to be perfectly air-tight, and are necessarily, from their considerable cost, of such a small size as to involve great loss of power in forcing high-pressure air through them.

COMPRESSIBI'LITY is that property of bodies by which they admit of being forced or pressed into less space than they formerly occupied. The particles composing bodies are in all cases at greater or less distances from one another; and whatever brings the particles closer together, diminishes the volume or bulk of the body. This may be effected by various agencies, as, e. g., by the withdrawal of heat (q. v.); but the effect is called compression only when it is caused by mechanical force, as by pressure or percussion. All bodies are compressible, but in different degrees. Many solids, especially those of a compact structure, have this property only in a slight degree. It was believed at one time that liquids were incompressible; more accurate experiments, however, have proved that this is not the case; water, for instance, subjected to a pressure of 15,000 lbs. on the square inch, loses 1·20 cf its volume. Gases, on the other hand, are strikingly compressible; by means of a common condensing syringe, a number of cubic inches of air can be forced into the space of one inch. Compression is in almost every instance accompanied by an evolution of heat. When a piston, having a piece of German-tinder attached to the bottom, is forced rapidly to the bottom of a shut condensing syringe, and rapidly withdrawn, the tinder is found ignited.

In a restricted sense, those gases are said to be compressible which, under great pressure, become liquid. This is the case with carbonic acid gas, chlorine, sulphurous acid gas, and others. Atmospheric air and its components have hitherto resisted all attempts to liquefy them; though it is believed that only a sufficient degree of pressure and cold is necessary to make any gas liquid. Carbonic acid and some other gases are liquefied in small quantities by enclosing the ingredients necessary for generating the gas in a strong glass tube, keeping them separate till the tube is hermetically sealed. The gas as it is produced, is condensed into a fluid by its own pressure, which is aided by keeping one end of the bent tube in a cooling mixture.

COMPU'LSION. Acts done or grants made under the influence of C.—i.e., either force or fear—are reducible by the law of Scotland. But the fear must be such as would shake a man of ordinary firmness and resolution. In like manner, the plea of *vis major*—that is, that the individual acted under the influence of power greater than his own—may relevantly be set up as a defence against such offences as rebellion, piracy, &c. See DURESS.

COMPURGA'TORS were twelve persons whom the law of our Saxon ancestors permitted the accused to call in proof of his innocency, and who joined their oaths to his. They were persons taken from the neighborhood, or otherwise known to the accused. It was rather in the character of jurymen than of witnesses that the C. acted, for what they swore to was not their knowledge, but their belief, and the institution belonged to a time when what has since been spoken of as the Saxon jury was taken from the persons in the neighborhood best acquainted with the

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matter to be investigated, and when they performed the combined functions of jurors, witnesses, and judges. The system of C. was adopted even in civil actions for debt, and the ceremony of what was called canonical purgation of clerks-convict, was not abolished in England till 18 Eliz. c. 7.

COMPUTATION OF TIME. See DAY.

CO'MRIE, a village and parish in the middle of Perthshire, on the Earn, a little east of Loch Earn, and 20 miles west of Perth. It lies amid the very picturesque scenery of the clay-slate band of Scotland, and is noted for frequent slight shocks of earthquakes. It has woollen and cotton weaving, and distilleries. Pop. (1871) 1911.

COMTE. Auguste, the founder of the "Positive Philosophy," was born at Montpelier in 1795 or 1797. He studied at Paris; and at an early period, it is said, attracted the attention of his companions by the boldness and novelty of his speculations, maintaining that the time was come when philosophy must undergo another great change, such as it had done in the days of Bacon. Mr G. H. Lewes, who regards C. as the Bacon of the 19th c., only much greater, informs us that C. was but *fourteen* when "the reforming spirit awoke" in him (see "Exposition of the Principles of the Positive Philosophy," by G. H. Lewes, Bohn, London, 1853). Shortly after this, and while still laboring under the excitement of his new convictions, he became acquainted with St Simon; entered enthusiastically into his theories, which had not a little in common with his own, and which possessed in addition this advantage, that they were the results of matured thinking (St Simon being then between fifty and sixty); and in 1820, was appointed by the master himself to prepare an exposition of the "Politique Positive" of the St Simonian Society. The work did not satisfy St Simon, who deplored the absence of the "religious and sentimental aspects" of his system. In 1825, on the death of St Simon, C. broke off altogether from his *confrères*, and in after-years, was accustomed to speak slightingly of his old master's abilities. In 1826, C. was attacked by a cerebral disorder, brought on by "overwork and heart-anxieties." He recovered, however, and in 1832, was appointed professor of mathematics at the *Ecole Polytechnique*, which situation he was forced to resign in 1852, on account of differences with his colleagues. He died at Paris, September 1857.

C.'s works are—"Cours de Philosophie Positive" (6 vols., Par. 1830—1842; freely translated into English, and condensed by Harriet Martineau, 2 vols., 1853), "Traité Elémentaire de Géométrie Analytique" (1843), "Traité d' Astronomie Populaire" (1845), "Discours sur l' Ensemble du Positivisme" (1848), "Système de Politique Positive" (4 vols., 1851—1854; Eng. trans. 1875 *et seq.*, Longmans), and "Catéchisme, Positiviste, ou Sommaire Exposition de la Religion Universelle" (1 vol., Par. 1852). It is impossible here to do more than state, in the briefest way, C.'s central and governing doctrine. It is this: The race (like the individual) necessarily passes through three intellectual stages—1. The *theological*, in which a supernatural origin is sought for all phenomena, and the *Deus ex machina* is the only explanation of events; 2. The *metaphysical*, in which the *sensuously* supernatural is set aside as incredible, and an effort is made to demonstrate the existence of "abstract forces or entities supposed to inhere in various substances, and capable of engendering phenomena;" 3. The *positive*, in which the mind affirms the futility both of theological and metaphysical inquiries, abandons all vain search after the *causes* and *essences* of things, "restricts itself to the observation and classification of phenomena, and to the discovery of the invariable relations of succession and similitude which things bear to each other; in a word, to the discovery of the *laws* of phenomena." This last is the stage at which C. conceives Europe to have arrived. Theology and metaphysics are alleged to be in their dotage, and all the anarchy of modern life to arise from the presence of these disturbing elements. To deliver us from their hurtful influence, C. employs the principles of positivism to organise a new social doctrine, which shall embrace the entire wants of man as an intellectual and emotional being. C. thus aims at being not only the founder of a new philosophy, but also of a new religion, and has even assumed the title of "Fondateur de la Religion de l'Humanité." His views, which are very original and comprehensive, have excited much attention among thinkers in France, England, and Germany, and obtained not a few ardent adherents.

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CON, or Col, an Italian particle, meaning "with," much used in musical terms as "con spirito," "con brio."

CONCAN, a territory in the presidency of Bombay, lies between the Arabian Sea and the watershed of the Western Ghauts, in lat. 15° 44'—20° 22' n., and long. 72° 52'—73° 45' e. Its length is 330 miles, and it varies in breadth from 25 to 50 miles. The more easterly section appears to be a succession of rocky terraces, of apparently volcanic origin. The maritime portion, averaging an elevation of 100 feet above the sea, rises here and there to far greater heights, partly in isolated hills, and partly in short ranges. The broad estuaries into which the rivers expand were formerly the retreats of pirates. Of the land that is available for cultivation, the larger part is found on the banks of the rivers—the growth of rice in particular being promoted by annual inundations. The chief peculiarity of the climate is, that the south-west monsoon, arrested in its career by the lofty barrier on the east, has been known to yield, in one year, a rainfall of nearly 300 inches. To omit the city of Bombay, as not being on the mainland, the principal towns are Junera, Ratnagherian, Vizladroog, and Vingorla. It was in 1818, on the fall of the Peishwa of the Mahrattas, that C. became British territory.

CO'NCAVE. A surface is said to be C. when lines drawn from point to point in it fall between the surface and the spectator; and convex, when the surface comes between him and such lines. The terms, it is obvious, are mere terms of relation. See LENS and MIRROR.

CONCEA'LMENT, in Criminal Law. The C. of an offender, after the commission of the crime, with the view of shielding him from justice, is an offence which may be punished arbitrarily; but C., in consequence of an agreement before the crime was committed, involves the concealer in a charge of art and part in the principal crime (Hume, 274, 281).

CONCEALMENT OF PREGNANCY AND BIRTH. See PREGNANCY, CONCEALMENT OF; INFANTICIDE.

CONCENTAI'NA, a town of Valencia, Spain, picturesquely situated on a slope of the Sierra Mariola, 28 miles north of Alicante. It is surrounded by old walls, flanked with towers; has some interesting old buildings; and manufactures of linen, woollen, paper, soap, &c. The fair annually held here is one of the largest in Spain. Pop. 6100.

CONCE'NTRIC. Circles are C. when they have the same centre, but radii of different lengths.

CONCEPCION. 1. A city near the mouth of the Biobio, the principal river of the republic of Chili, in lat. 36° 50' s., and long. 73° 5' w. In 1835, the place was almost destroyed by an earthquake, the cathedral and most of the other public buildings having been thrown down. The city is nevertheless one of the most regular and handsome in the republic, and numbers (1875) 18,277 inhabitants. The cathedral and several of the other public buildings are noteworthy. The industry of the place is chiefly in the hands of foreigners, especially Germans. The discovery in 1852 of coal-fields a little to the south of C. has done much to forward the prosperity of the city. Talcahuano, the port of C., is the safest and best harbor in all Chili, and ranks next to Valparaiso as a mart of foreign trade. Hides and tallow are exported.—2. The bay of the Pacific Ocean which forms the harbor of the city above mentioned. It affords good anchorage, communicating with the interior by means of the Biobio, and being sheltered from the open sea by the island of Quiriquino.—3. The province of which the city above mentioned is the capital. Occupying the entire breadth between the Andes and the coast, it is bounded on the s. by independent Araucania, and contains 3850 square miles. In 1875, the population amounted to 151,365.

CONCE'PTION, in Psychology. See IDEA.

CONCEPTION, Immaculate. See IMMACULATE CONCEPTION.

CONCEPTION OF OUR LADY, an order of nuns, founded in 1484, in honor of the immaculate conception, by Beatrix de Sylvia, sister of James, first Count of Poralegro, in Portugal. It was confirmed in 1489 by Pope Innocent VIII., who granted the sisterhood permission to follow the rule of the Cistercians; but after the

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death of the foundress in 1489, Cardinal Ximenes put the nuns under the direction of the Franciscans, and imposed on them the rule of St Clara. The order subsequently spread into Italy and France. Besides the grand office of the Franciscans, the nuns recite on Sundays and on holidays a lesser office, called the office of the Conception of the Holy Virgin. Their dress consists of a white gown, a blue mantle, and a scapulary, on which is worn the image of the Virgin.

CO'NCERT, a musical entertainment of concerted pieces, symphonies, &c., sometimes interspersed with songs, performed by an orchestra of many instruments. C. performances are now established in almost every city in Europe, and societies are formed to foster and encourage the art. Among the oldest institutions of this kind are the Gewandhaus Concerts in Leipsic, established in 1742; and the Concerts Spirituels in Paris, established in 1725. Of more recent institutions are the concerts of the Philharmonic Society in London, of the Conservatoire in Paris, and the Symphonic concerts in Berlin, &c.

CONCERTI'NA, a musical instrument of modern invention, the sounds of which are produced by free vibrating springs of metal, as in the accordion. The scale of the C. is very complete and extensive, beginning with the lowest note of the violin, G, and ascending chromatically for three-and-a-half octaves to C. Violin music can be performed on the C. with good effect. Every sound in the scale is double, and can be produced either by pulling the bellows open, or by pressing them together. Wheatstone of London is the inventor. Concertinas are now made in France and Germany, but not so perfectly as in England.

CONCE'RTO, a musical composition for a solo instrument, with orchestral accompaniments, calculated to give the performer an opportunity to display the highest mechanical skill, as well as intellectual cultivation in the art. The C. consists of three movements, each of which, like the whole, has a certain character, and like the symphony or the sonata, requires a clear development and treatment of the motives, and a strict adherence to the rules of form. When the form is in any way abridged, it is then called a concertino. From the beginning of the last century to the present time, the pianoforte and the violin are the solo instruments mostly used for the concerto. The oldest violin concertos are those by Tartini and his scholars. The French and Germans afterwards improved on these, and fixed the forms, which all the great masters of modern times have adhered to. Innumerable concertos have been written for the pianoforte, amongst which compositions of the most masterly kind are to be found. Concertos for wind-instruments have been less regarded, and are generally written by the performers themselves, and seldom deserve to be called classical works.

CONCHI'FERA (Lat. shell-bearing), in Lamarck's arrangement of mollusks, a class containing those which have bivalve shells; *Lamellibranchiata* (q. v.) and *Brachiopoda* (q. v.). The term is still sometimes used.

CO'NCHOID OF NICOME'DES, a curve invented by Nicomedes, with the view of trisecting an angle, of constructing two geometical means between two given straight lines, and of "doubling the cube." The curve may easily be described mechanically, and is frequently used in architecture as a bounding line of the vertical section of columns. The name is Greek, and means shell-shaped.

CONCHO'LOGY (Gr. *konchos*, a shell, *logos*, a discourse), the science which treats of shells and of the animals inhabiting them. C. as a science is at least as old as the days of Aristotle; the study of it was resumed along with that of the other sciences when the dark ages had passed away, but since the beginning of the present century it has given place to a more extended and comprehensive study of molluscous animals, now sometimes designated MALACOLOGY; the presence or absence of a shell having having been found not to constitute one of the most important characters which distinguish different classes of mollusks. C., indeed, was only the form of the science suited to a time when the shell was more considered than its inhabitant. Yet the relations between shells and the mollusks which possess them, are such that the labors of the merest conchologists have contributed to the real advancement of science, both zoological and geological. It is upon the knowledge of these relations that many of the conclusions of the geologist are founded. In systems of C. shells were usually divided into three orders, *Univalves*, *Bivalves*, and *Multivalves*, according to the number of pieces—one, two, or more—of

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which they are composed. The first two were established by Aristotle, the third was added in modern times.

CO'NCLAVE (Lat.), either the place where the cardinals assemble for the choice of a pope, or the assembly itself. The practice of a C. originated at the election of Gregory X. at Viterbo in 1271, and was regulated by the Council of Lyon in 1274, with formalities still substantially in force. The C. must consist of a single apartment, having only one door, which is kept securely locked. Food and other necessaries are handed through a window, and are subjected to a rigorous examination, in order to prevent communication with the outer world; the cardinals not being allowed to leave the place, or to receive or send out letters, until a new pope is chosen. As the C. was generally held in the Pauline Chapel at Rome, a number of little cells were erected in one of the galleries, each to form the lodgment of a cardinal.

A *Conclavist* is a spiritual or secular attendant on the cardinals during the C. Each cardinal is allowed three. They are sworn to silence, and are not allowed to leave, except in dangerous illness. This office is of great delicacy and trust; and formerly a sum of 10,000 crowns was divided among the conclavists at each election.

CO'NCORD, by English writers on music, is defined as the relation, harmony, or agreement between two or more consonant sounds; such as the union of the major or minor third with the perfect fifth and octave. The German musical technology gives a wider meaning to this term, defining C. as every simultaneous sounding of tones, whether in single intervals or in complete chords, and whether consonant or disconant.

CO'NCORD, the capital of New Hampshire, U. S.—called RUMFORD before the American Revolution, from which Count Rumford took his title—is on the right bank of the Merrimac River, 59 miles north-west of Boston, lat. 43° 12′ 29″ n., long. 71° 29′ w. C. is a handsome village, extending two miles along the river, with state-house, state-prison, state lunatic asylum, city hall, two railway dépôts, nine churches, four or five newspapers, and manufactures of carriages, iron, steel, machinery, musical instruments, woollens, leather, &c. Pop. (1870) 12,241.

CON'CORDANCE, a book arranged in alphabetical order, and shewing in how many passages all, or at least all the more important words in any work occur. For writings of universal import, from which passages are continually being adduced to prove or support principles affecting our daily life and action, such a hand-book is indispensable. The necessity of a C. for the Bible seems to have been felt at an early period. The first was executed by Antonius of Padua (b. 1195, d. 1231), who published it under the title "Concordantiæ Morales." He was followed by Hugo de St Caro (1244) and others, all of whom based their labors on the Latin Vulgate. A Greek C. by Euthalios of Rhodes was prepared about the year 1300, but has been lost. The Alexandrine C. of the Old Testament was compiled by Conrad Kircher in the 16th c., and Xistus Vetulius published in 1546 a C. of the Greek New Testament which was republished and amended by Stephens in 1600. In Hebrew a C was drawn up by Rabbi Isaac Nathan, in 1438, amended by Marius of Calassio (Rome, 1620), by John Buxtorf (1632), and by Fürst (Leip. 1837—1841). The chief concordances for Luther's translation of the Bible are those of Lankisch, Büchner, Wichman, and Schott. For the authorised English version of the Bible, the best C. was compiled by Alexander Cruden, and first published in 1737. Among the best editions of this work we may mention those bearing the dates 1810 and 1824. The C. of Parallels, by Crutwell (1790), is esteemed a valuable work. Among secular works of this kind, the "Complete Concordance to Shakespeare," compiled by Mrs. Cowden Clark (Lond. 1845), is one of the most remarkable.

CONCO'RDAT Lat. *concordatum*, "a thing agreed on"), although sometimes used of purely secular treaties, is now almost exclusively employed to designate a compact on ecclesiastical affairs between the pope, as head of the Roman Catholic Church, and the temporal ruler of a particular kingdom or state. Concordats commonly relate to things which are neither purely spiritual, as faith, the sacraments, or worship, nor purely temporal, as civil rights, taxation, &c., but mixed matters, regarding which each power makes certain claims, in regard of which the action of

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the two powers can with difficulty be dissociated; and in which, therefore, in the hope of harmonious co-operation for the public good, each is willing to cede to the other a portion of its peculiar right. Concordats are of two kinds—the first in the form of a treaty, to which both the contracting powers are formally consenting parties; the second, in which the terms are concerted by both, or, at least, are mutually accepted, but are published only by one, most commonly by the pope, in the form of a bull, reciting the enactments which result from the agreement. This difference is only in form. In both it is a settled doctrine of Roman Catholic canonists, and especially of those of the Ultramontane (q. v.) school, that the pope never absolutely cedes purely spiritual powers. Thus, in the presentation to bishoprics, while the king "nominated" or "elected," the pope always reserved to himself the power of "canonical institution."

We shall briefly enumerate the most important concordats. (1.) *Concordats with Germany.*—The earliest subject of negotiation between church and state in Germany was the mode of electing the popes, to which subject may be referred the compact of Otho I. with John XII., and the constitution of Leo VIII.; but the well-known concordat of Worms in 1123, regarding investitures, is commonly regarded as the first concordat strictly so called. Similar agreements took place on the question of the *Regalia* (q. v.), between the Roman see and the emperors Otho IV., Frederic II., and Rudolph of Hapsburg. A more comprehensive compact on church matters is that of which the foundation was laid at Constance in 1418, and which was subsequently modified, by the "Frankfort" or "Princes' Concordat," by the concordat of Aschaffenburg, and by that of Vienna; which last, although practically disregarded by Joseph II. and Leopold, continued in use till the suppression of the Emperor of Germany in 1803. Its place was supplied, under Pius VII., and his immediate successors, by separate concordats with Bavaria, 1817; Prussia, 1821; Baden, Würtemberg, and other minor states, 1818; Hanover, 1824; Saxony, 1827; and the Netherlands in the same year. The last German concordat was that concluded at Vienna, August 18, 1855. The chief articles were that the pope should have direct communication with the bishops, clergy, and people, and archbishops and bishops with their clergy and their flocks, and the right to govern their sees according to the canonical law. Education was placed entirely under the control of the church. The bishops were to settle what books should be used. The chief inspector of schools was to be chosen by the emperor from among the individuals selected by the bishops. The government bound itself to prevent the dissemination of books pointed out as dangerous to religion by the bishops or archbishops. All questions of marriage, except in so far as they might involve civil consequences, were reserved exclusively to the ecclesiastical courts. Priests guilty of crimes were to be tried in the temporal courts; but the bishop was to be duly notified of the fact, and convicted priests were to be imprisoned apart in a monastery or other ecclesiastical building. The emperor was to choose bishops, but with the advice of the existing bishops and archbishops. The church might acquire new property, but once acquired, it could not be sold or mortgaged without the consent of both pope and emperor. This concordat was set aside in 1868 in all the dominions of the Emperor of Austria. (2.) *With France.*—The Pragmatic Sanction, ascribed to St Louis, but really of later date, has some of the characteristics of a concordat; but the first proper concordat is that of Francis I. with Leo X. in 1515 and 1516, which continued in force, although with more than one conflict of the two powers, till the Revolution. In re-establishing the church in France, Napoleon Bonaparte, as first consul, concluded with Pius VII., through the agency of Cardinal Consalvi, the celebrated concordat of 1801; which he afterwards compelled the pope, then a captive at Fontainebleau, to modify by a new act in 1814. Both were ignored at the Restoration; but an attempt to produce a substitute in 1817, and again in 1819, led to no practical change. (3.) *With Italy.*—In Italy, an agreement regulating the election of bishops was concluded with Nice and Savoy by Nicholas V. in 1451; and a formal concordat was made with Sardinia by Benedict XIV. in 1740. The ecclesiastical affairs of Naples were anciently regulated by the terms of what was called the *Monarchia Sicula*; but a formal concordat was concluded with Charles III. by the same pope in 1741, and a new concordat was made by Pius VII. in 1818. (4.) *With Spain.*—Charles V. concluded a concordat for his Spanish kingdom with Adrian VI. and Clement VII.; and a further concordat was made by Clement XII. and

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Philip V. in 1737. (5.) *With Portugal.*—Benedict XIV. made a concordat with Portugal in 1741.

CO'NCRETE (Lat. *concrescere*, to grow together) is opposed to abstract (see ABSTRACTION). A concrete notion is the notion of an object as it exists in nature, invested with all its qualities, as any particular flower, leaf, or tree; an abstract notion is the notion of any attribute of that flower, leaf, or tree, such as its color, form, or height; qualities which may be thought of independently of the objects in which they inhere, though they cannot so exist.—The abstract method of handling a subject is adapted to speculation and reasoning; the C., to poetic effect and impressive illustration.

CONCRETE, a mixture of hydraulic or other mortar with gravel or shingle, which, on hardening, forms an artificial conglomerate. The best C. is made by well mixing hydraulic mortar (see CEMENT) with sand and sufficient water for complete hydration, and then adding the shingle or screened ballast, and mixing them well together. An inferior C. may be made by laying the shingle into the foundation or other place where the C. is required, and then pouring mortar upon it, to fill the interstices between the pebbles.

The principal use of C. is to form a basis of artificial stone for buildings that rest upon loose or damp subsoils. Such a basis, if well made, forms a solid foundation-slab upon which the weight of the whole structure is equally distributed. It also resists the capillary ascent of moisture from the soil, which would otherwise take place through brickwork or porous stone. A very extensive and important application of C. in this manner has been made in the lower part of Pimlico and Thames Bank. An extensive district that, only a few years since, was a pestiferous marsh, is now covered with high-class houses, and forms one of the fashionable quarters of the West End of London. The houses, and, in fact, the streets altogether, may be said to rest upon a substratum of artificial rock formed of C., which, besides giving stability to the buildings, shuts out the exhalations from the soil, and prevents the ascent of the moisture so abundant below.

C. is occasionally used for building walls by ramming it into moulds, giving it the form desired. A very beautiful application of C. for making mosaic floors is common in Italy. A stratum of cement is laid, and the surface carefully levelled; then pebbles of variegated colors are sifted over it; before it is quite hardened, these are beaten down, so as to be imbedded in the cement, and form the top layer. When the C. has completely hardened, the rounded surfaces of the pebbles are ground down by means of a large slab of stone, which, together with sharp sand, is rubbed over the surface until it is quite smooth; and thus a variegated pavement is formed by the flattened surfaces of the colored pebbles and the cement between them.

CONCRE'TION, in Medicine, a formation of solid unorganised masses within the body, either by chemical precipitation from the fluids, or by the accidental aggregation of solids introduced into the system from without. In the former case, a C. is termed a Calculus (q. v.); in the latter, the C. may be either wholly composed of solids foreign to the body, or these may be mingled with the elements of the secretions, as with mucus, or calculous matter. Thus beans, peas, needles, &c., introduced into the cavities of the body, have become the nuclei of concretions, by attracting around them mucus, or crystalline deposits from the urine. The most remarkable forms of C., however, are perhaps those formed in the stomach and intestines of man and the lower animals, from the more solid and indigestible parts of the food, or of substances improperly swallowed. Thus, young women have been known to acquire the habit of swallowing their own hair to a great extent; and very large concretions have been thus formed, which have proved fatal, by obstructing the passage of food. The use of oatmeal in large amount has also been found to lead to concretions, especially when eaten coarsely ground and unboiled; such concretions have commonly been found in the intestines. The excessive domestic use of magnesia in the solid form as a laxative, has been known to have a similar effect. In certain animals, intestinal concretions are not uncommon, and grow to an immense size; they used to be greatly prized as antidotes, and were used in medicine under the name of Bezoars (q. v.) In certain forms of morbid deposits, such as fibrous tumors (see TUMOR), and in tubercle (q. v.), concretions

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not unfrequently form; they are, for the most part, composed of phosphate of lime.

CONCRE'TIONARY STRU'CTURE is a condition in rocks produced by molecular aggregation subsequent to the deposition of the strata, whereby the material of the rock is formed into spherules or balls, as in the grains of oolitic limestone, or the larger concretions of magnesian limestone.

CONCU'BINAGE. The earliest Roman laws were distinguished for the strictness with which they treated marriage. They not only upheld thoroughly the principle of monogamy, but they fettered marriage itself with many burdensome forms. Hence arose the practice of a free unmarried man entering into a less strict relation with a single woman—a sort of permanent cohabitation. The offspring of such a connection, called natural children, had not the rights of legitimate children, but they were recognised by the father. Augustus, with a view to promote regular marriages, and check the growing licentiousness, enacted a comprehensive marriage-law (*Lex Julia et Papia Poppæa*), which still allowed C., but only with women of low rank or who had lost their station. Christianity required the complete sanctity of marriage, although the civil law long continued to tolerate separation at pleasure. In the Eastern empire, C. was entirely prohibited by the Emperor Leo. The ancient laws of the Germans recognised, along with regular marriage, an informal connection of the sexes. In the middle ages, a similar connection became customary, called a "left-handed," or Morganatic Marriage (q. v.). The Code Napoleon does not allow of C., but the wife can sue for separation only when the husband maintains a mistress in the common dwelling.

CONCU'RRENT JURISDI'CTION. Jurisdiction is said to be concurrent, or cumulative, when it may be exercised in the same cause by any one of two or more courts. To prevent the collision which might arise from each of the courts claiming to exercise the right, it has been established as a rule, that the judge who first exercises jurisdiction in the cause acquires a right *jure præventionis*, to judge in it exclusive of the others. The judge by whose authority an offender is first cited or first apprehended, prevents, and so excludes the other from the right of cognizance. "This right of prevention plainly appears to be peculiar to criminal jurisdiction. In civil it is the private pursuer who has the only right of choosing before which of the courts he shall sue."—Erskine's "Institutes," b. i. tit. ii. s. 9. Opposed to *concurrent* or *cumulative*, is *privative* jurisdiction. In England, in some cases, there is C. J. between the superior and county courts. "Where the plaintiff dwells more than 20 miles from the defendant; or where the cause of action did not arise wholly, or in some material point, within the jurisdiction of the court, within which the defendant dwells or carries on his business at the time of the action being commenced; or in general where any officer of the county court is a party; in any of these cases, the superior courts have a concurrent jurisdiction."—Stephen's "Com.," v. iii. p. 283. By 19 and 20 Vict. c. 108, s. 39, it is provided, that if, in an action or contract, the plaintiff claims more than £20, or, in an action of *tort* (that is, for wrong independent of contract), more than £5, and the defendant gives notice that he objects to the action being tried in the county courts, and gives security for the amount sued for with costs—all proceedings shall be stayed in the county court.—"Ib." note.

CONCU'SSION, in Medicine, a sudden impression or shock communicated to the brain or to the whole nervous system, as the result of a severe injury, or collision of the body with some external object, as in a fall, or in the crash of a railway accident. It is usual to distinguish C. from the more mechanical results of injury, by observing its effect upon the circulation and on the general sensibility; and there can be no doubt that the distinction is well founded, for in the first place death may follow from C. alone, without any appreciable destruction of texture; and 2dly, C. may be followed by recovery within a few hours, leaving the local injury entirely unattended by constitutional disturbance; or recovery may be complete, there having been no local injury at all. Under the immediate shock of injury, the patient is usually unconscious and insensible, pale, cold, sometimes shivering, pulseless, or nearly so, the pupils inclining to contraction rather than dilatation, or in some cases natural; the breathing is irregular, slow, feeble, and sighing; the secretions are suspended; the stomach often yields up its contents; and the bowels and

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bladder may also be evacuated. This state ends either in death, or in gradual reaction, which may pass over into a state of inflammatory fever, with violently excited circulation, and greatly increased heat of the surface. In the treatment of C., it is sometimes necessary to have recourse to stimulants; but in general, moderate heat applied to the surface, abundant supplies of fresh air, and careful adjustment of the injured parts, are all that is necessary till consciousness is somewhat restored, and the power of swallowing regained; some warm soup should then be given, with a small allowance of wine or other stimulant, proportioned to the age and habits of the individual; and the effect being carefully watched, this treatment may be continued until restoration is complete. If there be danger of failure of the breathing or heart's action, artificial respiration (see RESPIRATION) should be employed without delay; and the patient should be transferred as soon as possible from the place of the accident to a warm and comfortable bed, where the necessary restoratives may be more conveniently used. The connection of the nervous system with the heart, in cases of C., is a very curious subject in physiology, and has been the subject of minute investigations by Bichat, Legallois, Wilson Philip, Marshall Hall, and many others.

CONCUSSION FUSE. See FUSE.

CONCUSSION SHELL. See SHELLS.

CONDÉ, the name of several places in France, the following being the most important:

CONDÉ, in the department of Nord, situated at the confluence of the Haine and Scheldt, about seven miles north-north-east of Valenciennes. It has an arsenal and strong fortifications, constructed by Vauban, and was the scene of severe contests in the Napoleonic wars. Here are coal-pits and a great coal depot; and manufactures starch, chicory, leather, and soap. Pop. (1872) 2818.—CONDÉ-SUR-NOIREAU, a town in the department of Calvados, at the union of the Durance and the Noireau, 25 miles south-south-west of Caen. It is an old place, with dark heavy houses. Its manufactures are cottons, cutlery, and leather; and it has a pretty extensive trade in cattle, honey, &c. Pop. (1872) 6422.

CONDÉ, a family celebrated in French history, and which takes its name from the town of Condé (q. v.), in the department of Nord. One Godfrey de C., about the year 1200, was in possession of a part of the barony of Condé. His great-granddaughter, Jeanne of C., married in 1335 Jacques de Bourbon, Comte de la Marche, and the barony of C. went to their second son, Louis de Bourbon, Comte de Vendôme, whose great grand-son, Louis de Bourbon, Prince of C., in virtue of his blood-relationship to the royal family, assumed the title of Prince, and is regarded as the founder of the new house of this name.

CONDÉ, Louis de Bourbon, Prince de, was born 7th May, 1530, and first distinguished himself under Marshal Brissac. In the dissensions between the houses of Guise and Bourbon C. was the soul of his party, which was for the most part Calvinistic or Huguenot. It was he who directed the conspiracy of Amboise, which had for its aim the banishment of the Guises and the capture of Francis II. On its discovery he fled to his brother at Nérac, and there projected a plan for securing possession of all the large towns of France, which however miscarried, and C. himself was taken prisoner and condemned to be executed, from which fate he was luckily saved by the opportune death of the king. On the accession of Charles IX. to the throne C obtained his liberty and the governorship of Picardy, but the harsh treatment which the Huguenots in general received drove him into rebellion, and on the 11th of April, 1562, he commenced a civil war by the capture of Orleans, Rouen and other places. Defeated and taken prisoner at the battle of Dreux in the same year, he was employed by the victors in concluding a treaty of peace, which lasted only a short time. C. recommenced hostilities by a daring but unsuccessful attempt to possess himself of the person of his sovereign (28th September, 1567). After the battle of St. Denis, 10th November, 1567, a second peace was concluded; but having reason to believe that Catharine de Medici was plotting against his liberty, he once more renewed the war against the Catholic party in the beginning of 1569, but was again defeated and taken prisoner at the battle of Jarnac, 18th March of the same year. While his wounds were being dressed on the field, a captain of the Swiss guard named Montesquieu, approached and shot him through the head. C. was of

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of a joyous and amorous disposition. His gallantries were far from being in accordance with the austere character of the religion he professed, and it cannot be doubted that the feeling of political rivalry to the House of Lorraine which animated the Bourbon family, explains the career of C. quite as much as his religious convictions.

CONDÉ, Louis II. of Bourbon, Prince of, commonly termed "the Great Condé," was the great-grandson of the preceding, and was born September 8, 1621. In youth (1640—1642), he took part in the sieges of Arras and Perpignan, and commanded the army against the Spaniards in the Netherlands, where he almost extirpated the foe in the battle of Rocroi, May 19, 1643. In the autumn of the same year, he was sent to Alsace to support Turenne; and in the engagements of August 3 and 5, 1644, he defeated the Bavarian general Mercy near Freiburg, and so won for France a considerable portion of Germany. By the death of his father, 1646, C. became the head of his family, and, next to the Duke of Orleans, was the highest personage in the state. This pre-eminence excited the envy of Cardinal Mazarin, who, however, in 1648, intrusted C. with the command of the army in the Netherlands. Here the prince captured Ypres, and gained the battle at Lens, but was called back to Paris by the war of the Fronde (q. v.), which had just broken out. In this contest, C. at first sided with the court, while his brother, Prince of Conti, and his sister, the celebrated Duchess of Longueville, took the part of the *Frondeurs*. After the court had secretly escaped from Paris (January 6, 1649), C. concluded a treaty which insured the return of the court to Paris in August of the same year. But as this service met with no adequate thanks, C., who was the haughtiest Frenchman of his age, soon became more violently rebellious than the Frondeurs themselves, at least in his language and deportment. Cardinal Mazarin consequently arrested C., with his brother and the Duke of Longueville; but was soon compelled to release him, on account of the threatened operations of Turenne and the Fronde. Though C. now enjoyed the favor of the people, his relations with the court were unfriendly, even after Mazarin had been banished, and when Louis XIV. assumed the government, 1651. He therefore renewed the war, with, as some suppose, the ambitious view of obtaining the supreme power. At the head of troops collected in the Netherlands, he gained the battle of Bleneau, in April 1652, and immediately marched upon Paris, while Turenne, who had remained steady in his loyalty, advanced to defend the court. A bloody but indecisive struggle took place in the streets of Paris. Many of C.'s ablest adherents, however, were killed, and the Frondeurs began to give in. A treaty was drawn up, to which most of them agreed, but the proud impracticable C. would have nothing to do with it; furious at the defection of so many of his friends, he went into Champagne to gather troops, and after a fruitless effort to seize Paris, he left the country, and, on the formal outbreak of war between France and Spain, became generalissimo of the Spanish forces, but was unable to gain the advantage over Turenne. When the peace of the Pyrenees was concluded between France and Spain, it was thought advisable to enter into friendly relations with the brilliant traitor. C. was therefore pardoned, and reinstated in his former honors. The war having been renewed by Spain, 1673, he again commanded the French in the Netherlands. After Turenne's decease, he held the command in Germany, but was ultimately so disabled by gout, that he had to resign his post. He now retired to his estate of Chantilly, where he devoted his remaining years to literature (for which, in his early years, he had exhibited a strong predilection), the society of friends, and religious exercises. He died at Fontainbleau, December 11, 1686. The Prince of C. had a superior intellect and great strength of character, associated with pride. Though an able commander, he was disliked by the soldiers, on account of his severity.—Mahon, "Life of the Great Condé" (1840).

CONDE'NSER, the apparatus used in conjunction with an electrometer to increase its sensibility, and render it available for indicating the presence of very feeble electricity.

It is found that the efficiency of the C. depends upon the accurate grinding of the plates, the thinness and evenness of the layer of shell-lac with which their inner surfaces are varnished, the size of the plates, and their parallelism on removal. This last is of the utmost importance; and it is found, where numerical results are wanted, that little dependence can be placed on the parallelism attained

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by the hand. For more accurate observation, the C. is made quite separate from the electrometer. The plates are in this case attached vertically to two wooden pillars, on which they are insulated, and which slide in a horizontal groove made in the sole of the instrument. The plates, thus guided by the grooves, are made to approach and to retire from each other with their faces parallel. In a C. of this description, no shell-lac varnish is used, the air between the plates acting as the dielectric in its place. When one of the plates is connected with the knob of the electrometer, the observation proceeds as already detailed.

CONDENSING STEAM-ENGINE. See Steam-engine.

CONDESCE'NDENCE. In the judicial procedure of Scotland, a C. is an articulate statement of the facts, accompanied with a note of the grounds in law on which the pursuer of an action rests. Formerly, the C. was a separate pleading from the Summons, or judicial writ by which the defender is called into court. By the passing of 13 and 14 Vict. c. 36 (31st October 1850), and several subsequent statutes, the forms in Scotland were very much simplified. The summons, in place of containing a rambling statement of the grounds of action, which was afterwards to be rendered articulate and explicit by the C., is now a merely formal writ, setting forth the name and designation of the pursuer and defender, and the conclusions of the action. To the summons, however, is appended a C. setting forth the grounds of action in articulate statements, and to this again is subjoined a note of pleas in law, so that the whole case of the pursuer is contained in the very first pleading in the cause. The papers on both sides may be revised if necessary; and the record, as the written pleadings and productions are called, is then adjusted by the judge. The cause is then ready for Debate (q. v.).

CONDESCENDENCE and Claim. See Multiplepoinding.

CONDILLAC, Etienne Bonnot de Mably de, a French philosopher of the 18th c., was born at Grenoble, 1715. In early youth, his delicate health delayed his progress in education. In 1746, he published his "Essai sur l'Origine des Connaissances Humaines," a work which derives all thought and knowledge from the exercise of the senses. It was intended to carry out the principles of Locke, which were misunderstood and misrepresented by C. as entirely based on sensationalism. To refute various metaphysical theories, C. wrote a "Traité des Systèmes" (1749). In 1754, appeared his "Traité des Sensations"—a work supplying the details of the sensational theory. C. supposes a statue organized within like a man, but its body —so to speak—being composed of marble, hinders it from possessing any sensibility. C. further supposes himself to have the power of endowing the statue with one sense after another, until it becomes perfectly a human being, and so endeavors to shew that as it would then possess exactly the same kind of ideas as ourselves—and yet while destitute of sensations, possessed none—it logically follows that ideas spring exclusively from sensations. In all his writings, C. displayed acuteness in analysis, and as consistently as was possible, adhered to the extreme theory of sensationalism. C. passed his life mostly in quiet retirement, and died at his estate near Beaugenci, August 3, 1780.

CO'NDIMENTS, or seasoning agents, are those substances which are employed at table for the purpose of imparting a flavor or seasoning to the ordinary solid or liquid food. The greater part of C. are necessary to sustain the proper functions of the alimentary system, and besides gratifying the appetite, minister, more or less, to the wants of the structure. The principal C. are saline substances, such as common salt; acidulous bodies, such as acetic acid or vinegar; oily C., such as butter and olive-oil; saccharine substances, such as sugar and honey; and aromatic and pungent C., such as mustard, ginger, pepper, and pickles. The members of the last class owe their characteristic properties to the presence of a volatile oil or resin.

CONDITION, in Logic, denotes that which must precede the operation of a cause. It is not regarded as that which produces an effect, but as that which renders the production of one possible. For instance, when an impression is made on wax by a seal, the seal is said to be the cause; the softness or fluidity of the wax, a condition. Some logicians, however, are of opinion, that the distinction usually made between C. and cause is arbitrary.

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CONDITION. See TRAINING.

CONDITION, in Law. This word is of peculiar importance in the real property law of England, as forming the foundation upon which the right of alienation of land, as well as the system of entails and that of mortgages was raised. Originally, a gift of an estate to a tenant (or vassal) by the lord of the fee did not convey more than a life estate; and when a gift was made to a man the heirs of his body, it was held that it was a gift upon C. that he had heirs of his body. But if the C. was performed by his having children, although they might all die before his own death, the judges held that his estate became absolute, to the effect that he might aliene the land, and so bar not merely the succession of his issue, but the right of the lord in default of issue, although, if he did not aliene, the lord would recover in the event of the tenant's death without issue. But it came afterwards to be held that a gift to a man and the heirs of his body conferred what is called an estate tail, which might at once, by certain forms, be converted into an absolute estate, independent of the birth of issue. See ENTAIL.

A mortgage is an estate given to the mortgagee upon C. that he restores it upon payment of a fixed sum borrowed by the mortgager. This is an example of an estate upon C. *expressed*. An estate attached to an office is an estate in the holder of the office upon C. *implied*, that he shall perform its duties. A C. may also be either *precedent* or *subsequent*. In the former case the gift does not take effect until the C. is performed; in the latter it becomes void when the C. occurs. The right to take advantage of a C. subsequent cannot be bestowed on a stranger, but can only be reserved to the grantor and his heirs, though after such reservation it may be assigned to a stranger. Conditions which are incapable of performance, or contrary to law, are void; and if such a C. is precedent, it makes the gift void; if subsequent, the estate becomes absolute in the tenant. But if a C. become illegal, or impossible, subsequently to the making of the grant, it has a different effect, according as the effect is produced by statute or by other circumstances. If by statute, the party bound to perform the C. is relieved from it; if by other circumstances, he loses his right as being unable to perform the condition.

In contracts, conditions which are *mala in se* render the contract void; but it is otherwise if the C. is merely opposed to an arbitrary rule of law, in which case the C. only is void, and the contract subsists. In legacies, a similar rule prevails. But in the case of legacies, a C. impossible of performance is generally taken *pro non scripto*—whereas in contracts, it commonly annuls the claim of the party who has bound himself to its performance.

CONDITIONED, The Philosophy of the. This phrase has been brought into use by Sir W. Hamilton, to express the inability of the human mind to conceive or reason respecting the Absolute and the Infinite. Our thought, according to him, can only be of the *relative* and the *finite*, of which these terms are but the negations; relativity and finitude are the conditions under which the human intelligence operates. In a dissertation on this subject ("Discussions in Philosophy," p. 1) he criticises, and endeavors to refute the opposite position as maintained by Cousin—a modification of the previous doctrine of Schelling—that "the Unconditioned, the Absolute, the Infinite, is immediately known in consciousness, and this by difference, plurality, and relation."

As this doctrine of Sir W. Hamilton has been raised into an especial importance by Mr Mansel in his "Bampton Lectures," some account of the reasonings adduced in its favor may here be given. We shall first quote the author's own statement:

"In our opinion, the mind can conceive, and consequently can know, only the *limited, and the conditionally limited*. The unconditionally unlimited, or the *Infinite*, the unconditionally limited, or the *Absolute*, cannot positively be construed to the mind; they can be conceived only by thinking away from, or abstraction of, those very conditions under which thought itself is realised; consequently, the notion of the unconditioned is only *negative*—negative of the conceivable itself. For example: On the one hand, we can positively conceive neither an absolute whole, that is, a whole so great that we cannot also conceive it as a relative part of a still greater whole; nor an absolute part, that is, a part so small that we cannot also conceive it as a relative whole, divisible into smaller parts. On the other hand, we cannot positively represent, or realise, or construe to the mind (as here Understanding and Imagination coincide) an infinite whole, for this could only

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be done by the infinite synthesis (union) in thought of finite wholes, which would of itself require an infinite time for its accomplishment; nor, for the same reason, can we follow out in thought an infinite divisibility of parts. The result is the same, whether we apply the process to limitation in *space*, in *time*, or in degree. The unconditional negation, and the unconditional affirmation of limitation; in other words, the *Infinite* and the *Absolute, properly so called*, are thus equally inconceivable to us."—"Discussions," p. 13, 2d edition.

The fundamental ideas involved in this view are certain observed facts with reference to the human mind, or the human consciousness; which facts, although very much overlooked in former times, are now beginning to be pretty generally recognised. It is a general law of our mental constitution, that change of impression is essential to consciousness in every form. The remark was made by Hobbes, that it is "almost all one for a man to be always sensible of one and the same thing, and not to be sensible at all of anything." There are notable examples to shew that an unvarying action on the senses fails to give any perception whatever. Take the pressure of the air on the surface of the body. Here we have an exceedingly powerful effect upon one of the special senses. The skin is under an influence exactly of that nature that wakens the feeling of touch but no feeling comes. Withdraw any portion of the pressure, as with a cupping-glass, and sensibility is developed. A constant impression is thus, to the mind, the same as a blank. Our partial unconsciousness of our clothing is connected with the constancy of the object. Remission or change is, therefore, absolutely requisite in order to sensibility.

The necessity of change in order to produce feeling or consciousness of any sort must apply to the special kind of consciousness that we call knowledge. To know light, is to pass from its presence to its absence, or the opposite; everlasting, unvarying luminosity, in an eye always awake, would not be known to the human mind. It is transition that develops knowledge, whence flows the important consequence, that knowledge *never can be of one property alone;* there must always be at least two properties in every act of knowing. We may say that we know light; but in so doing we also know darkness, and we could not know either by itself. When we touch clay and marble, we know hard and soft; but if we had never touched a soft body, we should have no conception of a hard one. Living in one constant temperature, like the fish in the tropical seas, we should know neither heat nor cold; passing from a high temperature to a low, or from a low to a high, we know both; and such is the alternative presented in every case to the human understanding. This great fundamental law of the human mind is now commonly designated by the phrase, *the relativity of knowledge or of cognition.*

Mr Mansel, accordingly, disputes the possibility of our conceiving the infinite, by shewing that such a conception passes the limits of human consciousness. The following extract will shew his mode of reasoning: "Now, in the first place, the very conception of consciousness, in whatever mode it may be manifested, necessarily implies *distinction between one object and another.* To be conscious, we must be conscious of something; and that something can only be known as that which it is by being distinguished from that which it is not. But distinction is necessarily limitation; for, if one object is to be distinguished from another, it must possess some form of existence which the other has not, or it must possess some form which the other has. But it is obvious that the infinite cannot be distinguished, as such, from the finite, by the absence of any quality which the finite possesses; for such absence would be a limitation. Nor yet can it be distinguished by the presence of an attribute which the finite has not; for, as no finite part can be a constituent of an infinite whole, this differential characteristic must itself be infinite, and must at the same time have nothing in common with the finite. We are thus thrown back upon our former impossibility."—Lecture 8d.

"A second characteristic of consciousness," according to Mr Mansel, "is, that it is only possible in the form of a *relation.* There must be a Subject, or person conscious, and an Object, or thing of which he is conscious. There can be no consciousness without the union of these two factors; and, in that union, each exists only as it is related to the other. The subject is a subject, only in so far as it is conscious of an object; the object is an object, only in so far as it is apprehended by a subject; and the destruction of either is the destruction of consciousness itself. It is thus manifest that a consciousness of the absolute is equally self-contradictory

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with that of the infinite. To be conscious of the absolute as such, we must know that an object which is given in relation to our consciousness, is identical with one which exists in its own nature, out of all relation to consciousness. But to know this identity, we must be able to compare the two together; and such a comparison is itself a contradiction. We are, in fact, required to compare that of which we are conscious, with that of which we are not conscious, the comparison itself being an act of consciousness, and only possible through the consciousness of both objects."

The author then lays down a third condition of consciousness—namely, relation to *time*. Everything conceived by us is conceived as under the two manifestations of *succession* and *duration*, from which he endeavors to shew "that an act of *creation*, in the highest sense of the term—that is to say, an absolutely first link in the chain of phenomena, preceded by no temporal antecedent—is to human thought inconceivable. To represent in thought the first act of the first cause of all things, I must conceive myself as placed in imagination at the point at which temporal succession commences, and as thus conscious of the relation between a phenomenon in time and a phenomenon out of time. But the consciousness of such a relation implies a consciousness of both the related members; to realise which, the mind must be in and out of time at the same moment."

And, further: "Subordinate to the general law of time, to which all consciousness is subject, there are two inferior conditions, to which the two great divisions of consciousness are severally subject. Our knowledge of body is governed by the condition of *space*, our knowledge of mind by that of *personality*. I can conceive no qualities of body save as having a definite local position; and I can conceive no qualities of mind save as modes of a conscious self."—Lecture 8d.

By the application of those four conditions or limitations of the human consciousness—distinction, relation, succession, and duration in time, and personality as regards the conception of mind—it is Mr Mansel's purpose to demolish the foundations of the metaphysical theology of former ages, which was largely conversant with proofs *à priori* of the infinity and the absolute existence of a Deity. According to him, a rational theology is impossible to be attained. "Our whole consciousness manifests itself as subject to certain limits, which we are unable, in any act of thought, to transgress. That which falls within these limits, as an object of thought, is known to us as *relative* and *finite*. The *absolute* and the *infinite* are thus, like the *inconceivable* and the *imperceptible*, names indicating, not an object of thought or of consciousness at all, but the mere absence of the conditions under which consciousness is possible. The attempt to construct in thought an object answering to such names, necessarily results in contradiction—a contradiction, however, which we have ourselves produced by the attempt to think—which exists in the act of thought, but not beyond it—which destroys the conception as such, but indicates nothing concerning the existence or non-existence of that which we try to conceive. It proves our own impotence, and it proves nothing more."

CONDOM, a town of France, in the dep. of Gers, pleasantly situated on a height on the river Baise, here crossed by two bridges, 25 miles n.-n.-w. of Auch. The town is very old, having been founded in 721, is irregularly built, but has handsome suburbs. It has a handsome Gothic church, an exchange, and two hospitals. There is a very considerable trade in grain, flour, wine, and brandy, and manufactures of cotton and mixed fabrics, cotton yarn, and earthenware. C. was formerly the capital of an extensive district, now comprised in the departments of Gers, Landes, and Lot-et-Garonne. Bossuet was at one time Bishop of Condom. Pop. (1872) 5083.

CONDONA'TION, in the legal phraseology both of England and Scotland, means forgiveness, or *remissio injuriarum*, when urged as a defence against an action of divorce on the ground of adultery.

CO'NDOR (*Sarcoramphus gryphus*,) the great vulture of the Andes, and the largest of known flying birds. Its dimensions, however, were for a long time greatly exaggerated. It is not always much larger than the *lämmergeyer* of the Alps, being sometimes not scarcely more than four feet long, and its expanse of wings about nine feet, although these dimensions are often considerably exceeded, and the expanse of wings reaches fully fourteen feet. The wings are long, and extremely powerful; the tail short, and wedge-shaped; the general color black, which is bright-

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est in old males, the young being of a brownish color, which has given rise to a notion that there are two species: the males are also distinguished by having great part of the wings white. Around the lower part of the neck of both sexes there is a broad white ruff of downy feathers, above which the skin is bare, and exhibits many folds. The head of the male is crowned with a large cartilaginous comb, and the neck is furnished with a dilatable wattle. The beak is thick and strong, straight at the base, but the upper mandible strongly curved at the extremity. The C. feeds mostly on carrion. Its voracity is enormous. Tschudi mentions one in confinement at Valparaiso which ate 18 lbs. of meat in a single day, and seemed next day to have as good an appetite as usual. Condors often gorge themselves so that they cannot fly, and if attacked, must disgorge in order to escape. They inhabit regions 10,000 or 15,000 feet above the level of the sea, where they breed, making no nest, but laying their eggs on the bare rocks, and where they are usually seen in small groups. To these haunts they return, after their descents into the plains for food. The height to which the C. soars in the air exceeds that of any other bird, and is said to be almost six perpendicular miles above the level of the sea, or nearly six times the ordinary height of the clouds.—To the same genus with the C., distinguished by the cartilaginous comb, bare neck, and peculiar shape of bill, belong the King Vulture, or King of the Vultures (*S. papa*), of the warm parts of America, and the Californian Vulture (*S. Californianus*). The king of the vultures is about the size of a goose, and derives its name from its driving away other vultures from prey at its pleasure. Its plumage is finely colored, reddish above, white beneath, with bluish-gray ruff, and black quills and tail.—The birds of this genus have no voice, and make only a sort of weak snorting.

CONDORCET, Jean Antoine Nicolas de Caritat, Marquis de, an eminent French author, was born September 17, 1743, at Ribemont, near St. Quentin, in the department of Aisne; studied at the college of Navarre, and by his "Essai sur le Calcul Intégral" (afterwards given in an extended form in his "Essais d'Analyse"), gained for himself at an early age a seat in the Academy of Sciences. With ease and remarkable ingenuity C. treated the most difficult problems of mathematics, but though deserving high paise, his powers lay rather in suggestion than in rigorous demonstration. After the appearance of his "Eloges des Académiciens Morts avant 1699" (Paris, 1778), he was made secretary of the Academy, 1777. His theory of comets gained in the same year a prize in the Berlin Academy. In concert with Turgot, he was induced to subject the system of the economists to a close examination, and was led by D'Alembert to take an active part in the "Encyclopédie." In all his works, as for example in the "Eloges et Pensées de Pascal," we find noble views of human destiny and evidences of a truly benevolent disposition. At the Revolution he was elected member for Paris in the Legislative Assembly, of which he was president in 1792. In the National Convention, as deputy for the department of Aisne, he mostly voted with the Girondists, and shared in the downfall of that party. Accused in October 1793, he concealed himself and consequently was outlawed. A generous lady, Madame Verney, had the courage to provide for him a hiding place, where he remained for some months and in very miserable circumstances wrote his most remarkable work, the "Esquisse des Progrès de l'Esprit Humain." Having afterwards quitted his concealment, he was arrested at Clamart, sent to Bourg-la-Reine, and cast into prison. The next morning, March 28, 1794, he was found lying dead on the floor. He had, it is believed, poisoned himself. His collected works (exclusive of his mathematical essays) were edited by Garat and Cabanis (21 vols., Paris, 1804). His wife, SOPHIE DE C. (sister of Marshal Grouchy), born 1765, assisted in the literary labors of C. and also translated into French Adam Smith's "Theory of Moral Sentiments." She died September 6, 1822.

CONDOTTIE'RI, the name given in the 14th c. to the leaders of certain bands of military adventurers who, for booty, offered their services to any party in any contest, and often practised warfare on their own account purely for the sake of plunder. These mercenaries were called into action by the endless feuds of the Italian states during the middle ages. Among the most celebrated of their leaders were Guarnieri, Lando, Francis of Carmagnola (about 1412), and Francis Sforza (about 1450). The last-mentioned made himself Duke of Milan. The *Compagnies Grandes* in France, during the 14th c. resembled the bands led by the Italian condottieri. They originated in the long bloody wars between France and England.

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The mischief done by them became so intolerable, that in several parts of the country the peasantry armed themselves, and under the name of *pacifères*, formed associations against the plunderers. Nevertheless, these French C. were so powerful that, in 1361, they routed the king's forces which had been sent against them, at Brignais, near Lyon, and slew the Constable of France, Jacques de Bourbon; but the Constable du Guesclin having persuaded them to seek their fortune in the Spanish service, they at length disappeared from the country.

CONDU'CTOR, in Music, is the person placed at the head of a band of musicians to lead the performance and beat the time. In Germany, the term Dirigent is used, which is more expressive.

CONDUCTORS, in the Royal Artillery, are those artillerymen who have charge of the ammunition-wagons in the field; they are, to some extent, under the control of the commissariat officers, who have to provide means of transport; but since the recent changes in the commissariat department, they have been more exclusively under the control of their own proper artillery officers.

CONDUCTORS AND NON-CONDUCTORS OF ELECTRICITY. If a rod of metal be made to touch the prime conductor of an electrical machine immediately after the plate has ceased to rotate, every trace of electricity immediately disappears. But if the rod were of shell-lac, little or no diminution would be perceptible in the electrical excitement of the conductor. The metal in this case leads away the electricity into the body of the experimenter, and thence into the ground, where it becomes lost, and it receives in consequence the name of a conductor. The shell-lac, for the opposite reason, is called a non-conductor. Different substances are found to possess the power of conducting electricity in very different degrees. The following series classifies the more common substances according to their conducting powers, beginning with the best, and ending with the worst conductors. Conductors—The metals, graphite, sea-water, spring-water, rain-water. Semi-conductors—Alcohol and ether, dry wood, marble, paper, straw, ice at 32° F. Non-conductors—Dry metallic oxides, fatty oils, ice at —13° F., phosphorus, lime, chalk, caoutchouc, camphor, porcelain, leather, dry paper, feathers, hair, wool, silk, gems, glass, agate, wax, sulphur, resin, amber, shell-lac.

The arrangement into conductors, semi-conductors, and non-conductors, is made with reference to frictional electricity, or electricity of a high tension. The substances which are semi-conductors for frictional electricity are found to be almost, if not altogether, non-conducting for the electricity of the galvanic battery, which is too feeble to force a passage through them. The metals, which appear to be all nearly alike conducting for frictional electricity, offer widely differing resistances to the transmission of the galvanic current. By experiments made with galvanic electricity, it is found that the more ordinary metals stand thus, as regards their powers of conduction, beginning as before with the best conductor: Silver, gold, copper, brass, zinc, iron, platinum, tin, nickel, lead, German-silver, mercury. An increase of temperature has in the metals the effect of lessening the conducting power, whilst in almost all other substances, it has an opposite effect. Glass becomes conducting at a red heat, and so do wax, sulphur, amber, and shell-lac, when fused.

When a conductor is placed on non-conducting supports, so as to prevent the electricity communicated to it from passing into the ground, it is said to be insulated. The usual insulating material employed in the construction of electrical apparatus is glass, which, though not so perfect a non-conductor as the others lower in the scale, far exceeds them in hardness and durability. In a damp atmosphere, glass becomes coated with a thin layer of moisture, which very considerably diminishes its insulating power. Hence arises the necessity in certain states of weather of heating so as to dry all electrical apparatus previous to use. This imperfection is very much lessened by covering the glass with shell-lac varnish.

The very fact that a conductor may be insulated, indicates that the air is a non-conductor. Dry air possesses this property in a high degree, while moist air renders insulation for any length of time impossible.

CONDY'S FLUID. See MANGANESE.

CONE (*strobilus*), in Botany, a fruit-bearing spike covered with scales, each of which has two seeds at its base. Such are the fruits of the *Coniferæ* (fir-cones or

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fir-tops), from the usual shape of which the name C. is derived, also the fruits of the *Casuarineæ*. The name C. is applied also to the female spike, even when in flower. The scales of true cones, until they separate to allow the dispersion of the seeds, are closely compacted together; in the hop, to the fruit of which the name C. is not applied, although *strobilus* is, they are loose. Some true cones, as those of the *Araucaria*, are very far from being conical in shape. The fruit of the juniper (a *galbulus*) is a C. of which the scales have become fleshy, so as to form a false berry.

CONE. There are various kind of cones, but the term is usually applied only to those having circular bases. The most common kind of circular C. is the *right* C., which may be conceived as being generated by the revolution of a right-angled triangle round one of its legs. The line from the apex of a C. to the centre of the base is called the axis, and, in the right C., it is perpendicular to the base. In the *oblique* C., the axis is inclined to the plane of the base at an angle other than a right angle. A *truncated* C. is the lower part of a C. cut by a plane parallel to the base. —Four curves, called the CONIC SECTIONS, may be formed by cutting the right C. in different directions. If the C. be cut by a plane parallel to the base, the section is a circle; if the plane cut the C. across, making any angle other than a right angle with its axis, the section is an ellipse; if the cutting plane be parallel to the side of the C., the section will be a parabola. In every other case than those stated, the section will be an hyperbola. If two cones were set one above the other, the one being just a continuation of the other through the apex, the plane producing the hyperbolic section would cut the second as well as the first, though none of the other planes would. There are thus two equal branches of hyperbola belonging to the two cones respectively. See CIRCLE, PARABOLA, &c.

CONEGLIA'NO, a town of Northern Italy, 23 miles north-east of Venice. It is situated on a hill-slope, crowned by an extensive castle, and has a very picturesque appearance. Half-obliterated frescoes adorn the outside of several houses in the town. C. has manufactures of woollens and silks, and a population of 6500.

CONE-SHELL (*Conus* and *Conidæ*), a genus and family of gasteropodous molluscs, of the order *Pectinibranchiata*, having a shell of remarkably regular conical form; the spire on the base of the cone, and sometimes rising from it to a sharp point, sometimes almost flat; the aperture narrow and straight, without protuberance or fold, extending from the base of the cone to its apex. The head of the animal has a proboscis capable of much extension; the mantle is scanty and narrow, forming an elongated siphon in front; the shell covered with an epidermis. These molluscs are carnivorous, they inhabit shores and banks of sandy mud, chiefly within the tropics, a few only occurring in the Mediterranean. The shells of many species are very beautiful, and much prized by collectors.—Cone-shells first appear in the chalk, and become more abundant in the more recent formations.

CONFARREA'TION was a peculiar mode of marriage in use among the Romans, and supposed to have been originally that practised by the patricians. Its specialty consisted in the employment of certain words in the presence of ten witnesses, and in the performance of a religious ceremony in which *panis farreus* (bread made of spelt) was used. Various priestly offices, such as that of the *Flamen Dialis*, were open only to those who were born of parents thus married.

CONFEDERA'TION, Germanic. See GERMANY.

CONFEDERATION OF THE RHINE. During the war of 1805, so disastrous for Austria, several German princes, too weak to remain neutral, were forced to ally themselves with France. The first to do so were the Electors of Bavaria and Würtemberg, who, in recompense of their services, were elevated to the dignity of kings by the peace of Presburg, 26th December 1805. Some months after (28th May 1806), the arch-chancellor of the empire announced at the diet that he had chosen as his coadjutor and successor Cardinal Fesch, the uncle of Napoleon, a thing entirely contrary to the constitution of the Germanic empire. Finally, at Paris, on the 12th of July 1806, 16 German princes formally signed an act of confederation, dissolving their connection with the Germanic empire, and allying themselves with France. These 16 princes were—the kings of Bavaria and Würtemberg, the archchancellor, the Elector of Baden, the new Duke of Cleves and Berg (Joachim Murat),

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the Landgraf of Hesse-Darmstadt, the Princes of Nassau-Usingen, Nassau-Weilburg, Hohenzollern-Hechingen, Hohenzollern-Sigmaringen, Salm Salm, Salm-Kyrburg, the Duke of Arenberg, the Princes of Isenberg-Birstein and Lichtenstein, and the Count of Leyen. These individuals justified (or were forced to justify) their conduct by enumerating the vices of the constitution of the Germanic empire, and invited the remaining princes of Germany to imitate their example. At the same time, Bacher, the French ambassador, declared that his master no longer recognised the Germanic empire; while the territories and titles of the confederate princes (who were now under the protectorate of Napoleon) underwent considerable changes. In addition to these changes, a number of other princes and nobles of the empire were made dependent (see MEDIATISATION) on the confederation. During the years 1806—1808, several other petty German sovereigns, alarmed at the triumphs of Napoleon, hastened to enrol themselves members of this unpatriotic league; and at the close of 1808, it embraced a territory of 122,236 square miles, contained a population of 14,608,877 souls, and kept up an army of 119,180 men. The utter ruin which overtook the French army in the Russian campaign acted like a solvent on the confederation, and the year 1813 saw it vanish like mist in the sudden outburst of German patriotism, when a whole people leaped up as one man, and delivered themselves from a cruel and insulting bondage.

CO'NFERENCE, in English Law, signifies the interview of an attorney or solicitor with a counsel, when consulting him. Consultation properly means the meeting of barristers with each other.

CONFERENCE, WESLEYAN. See METHODIST.

CONFE'RVA, a genus of plants of the natural order *Algæ*, sub-order *Confervaceæ* (or order *Confervaceæ*). The plants of this genus consist of simple or branching jointed filaments, which are filled with green—seldom purple or red—matter, and are found in abundance in water—some of them in fresh, and some in salt water—and on moist earth. *C. rivularis*, a species common in brooks, is sometimes 2—4 yards in length, and was formerly used as an application to wounds and slight burns. This and other species are sometimes called *Crow Silk*, and are used in some places for stuffing mattrasses. *C. rupestris* often covers whole rocks on the sea-coast. *C. crispa* sometimes forms a close entangled layer on inundated land, and has received the name of *Water Flannel*. *C. ægagropila*, sometimes called *Moore Ball*, is found in lakes and ponds, where it floats about freely in the water, its filaments forming an entangled ball, capable of being employed as a pen-wiper.—The name C. is not always strictly limited to the genus, but is extended to many of its near allies. Among the *Confervaceæ* or Confervals—however, are included many plants, as the different kinds of Laver, which have a flat, and not a thread-like frond. Many also consist of cells immersed in a slimy matter. The *Confervaceæ* grow by the division, and sometimes by the branching of cells; reproduction takes place by *spores*, formed in the interior of the cells and which at last are discharged through the walls of the mother-cell. The very interesting phenomenon of the Conjugation (q. v.) of cells has been observed in them. The spores assume the character of Zoospores (q. v.), exhibiting movements which resemble those of animals, before leaving the mother-cell, and retain this character for some time after escaping from it. *Confervaceæ* are found plentifully even in mineral waters. Their great abundance often gives a color to the whole water of tanks, marshes, &c. The Red Sea is said to derive its name from the color sometimes given to the surface of its waters, for distances as great as the eye can reach, by small *Confervaceæ*. The yeast-plant has been ranked among *Confervaceæ*, but is more generally regarded as one of the *Fungi*. Other vegetable organisms which appear in liquids of the most various kinds, and which have also been ranked among *Confervaceæ*, are more probably the *mycelium* of imperfectly developed *Fungi*. The plants noticed in the article ALGÆ as appearing in diseased conditions of animals, are regarded as *Confervaceæ*.—The Lavers are almost the only *Confervaceæ* ever used for human food.

CONFE'SSION, in Roman Catholic theology, means a declaration of sins to a priest in order to obtain absolution. The practice of C. is believed by Roman Catholics to be of divine institution, being founded on the power of binding and loosing from sin conferred on the apostles by Christ (Matt. xvi. 19, xviii. 18, and

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John xv. 22, 23). The power of binding *or* loosing, being in the view of its advocates judicial and discretionary, presupposes a confession of sins in order to its being judicially exercised. Although some allusions to C. are found in the New Testament, Catholics do not allege any former scriptural precept for it, but they contend that the above passages contain an implied precept, which they further support by testimonies of the Fathers. Though the apostle James recommends that Christians should confess their "faults one to another," yet formal and open C. appears to have been first required in cases where persons guilty of gross apostasy desired to be again received into the church. Motives of piety, and a wish to avoid the scandal of open C., led gradually to the institution of private C. in the bearing of a priest. In and after the 5th c., such C. was made an indispensable preparation for receiving the sacrament of the Lord's Supper. Open or public C., which was part of the discipline of public penance, ceased when that discipline went into disuse. Private C. has been retained, and though its defenders hold it to have been at all times in use, a general law was enacted by the fourth Council of the Lateran (can. xxi., *Omnis utriusque sexus*), requiring that every Christian who has attained the years of discretion should confess to a priest approved for the purpose, at least once in the year; and they insist that this law was by no means the origin of the precept of C., but merely defined the time of its fulfilment. C. is one of the three "acts of the penitent"—contrition, confession, and satisfaction—which the Council of Trent declares to be parts of the sacrament of penance. The sinner is required to confess each and every mortal sin, in thought, word, and deed, which, after diligent examination of his conscience, has occurred to his memory. He is exhorted, but not required, also to confess Venial Sins (q. v.), especially if they be habitual. C., in order to be fruitful, must be accompanied by contrition and a purpose of amendment. It commonly embraces the sins committed since the last C.; but may include a longer period, and even the entire life. In the latter case, the C. is called general. It is called "auricular," as being made to the private "ear" of the priest; and is ordinarily spoken, but in cases of necessity may be made in writing, by signs, or even by an interpreter. Priests cannot validly receive confessions in any place without the "approbation" of the bishop of the place, which may be given either absolutely or with restrictions. C. is prescribed in the ritual of the Greek, the Russo-Greek, the Coptic, the Syrian, and the other oriental churches. In most of these churches the practice is obligatory, but in some it has gone into disuse. The Lutheran Church professes (according to the 11th art. of the "Augsburg Confession") "that private confession must be retained in the church; but that full and particular statement of *all* sins is not necessary, because, according to Psalm xix. 12, it is impossible." In the Apology of the Augsburg Confession, it is said to be "impious" to abolish the practice of private C. to the priest; but in practice, the Lutheran Church has widely departed from these rules. The Reformed Church (in Germany) has always been more inclined to general C.; and the United Church also substitutes for private C. certain devotional exercises previous to communion. The Church of England employs a general form of C. and absolution in its morning and evening services, but retains private C. in the rubric for visitation of the sick. The Scotch churches do not recognize it at all.—The *Sigillum Confessionis* ("seal of confession"), both in the Roman Catholic and in the German Protestant Church, means the obligation of a confessor or priest not to divulge the secrets of the confessional. This custom of secrecy is traceable in the 4th and 5th centuries, but was made binding by Innocent III. in the 12th, and its violation by a priest makes him subject to the severest penalties that can be inflicted by the church. See CONFIDENTIALITY.

CONFESSION, in Law, is the admission of his guilt by an accused person. In England, proof of C. is sufficient to warrant a jury in convicting without more evidence; in Scotland, some corroborating circumstance must be proved. In both countries, however, the C., to be admissible, must have been made without any promise or threat held out to induce it. As to C. on trial, see PLEA OF GUILTY; and as to C. before the examining magistrate, see DECLARATION.

CONFESSION AND AVOIDANCE, in pleading at common law, in England, is the admission of the allegation of the opposite party, but with the addition of some circumstance which deprives it of legal effect, as, for instance, the admitting that

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an assault was committed as alleged, but with the assertion that it was committed in self-defence. See PLEADING.

CONFESSION, Judgment by, in England, is judgment against a defendant on his confessing both the facts and law alleged by the plaintiff. An agreement to confess judgment is a common mode of securing money, but is subject to strict technical regulations.

CONFESSION OF FAITH. See CREEDS AND CONFESSIONS.

CONFE'SSIONAL, the seat or recess in which the priest sits to hear confession in a Roman Catholic church. It is probable that the confessionals in English churches, previous to the Reformation, like those still found in Catholic use, were slight wooden erections, because they have so entirely disappeared that their form is a matter of dispute among ecclesiologists. It would seem that confessionals were not always used, as in an old painting on the walls of St Mary's Chapel, Winchester, a woman is represented kneeling to a priest, who is seated in his stall. The confessional commonly has a door in front for the priest to enter by, and an opening on one or both sides, like a small window, with a grating of wire or zinc, for the penitents to speak through.

CO'NFIDENT PERSON. See INSOLVENCY.

CONFIDENTIALITY, in Law. The most common instance of C. is in the case of those communications between a client and his legal adviser, which neither of them can be called on to produce in a suit, and upon which no action of damages can be founded. The privilege extends to letters written by the lawyer to his client, relating to a suit which is either pending or contemplated; but to what extent it covers other business communications, is a question on which there are conflicting authorities in Scotland. In England, the rule has received a liberal interpretation (Dickson on "Evidence," p. 930). The same privilege is extended to the communications of several parties, or of their counsel and agents engaged on the same side of a cause, and made with a view to their joint prosecution or defence. Where a party, placed in such circumstances, is examined as a witness, he will be entitled to decline answering questions as to such communings, and even bound to do so, unless the privilege is waived by the other party interested (Dickson, p. 924). The principle on which this privilege rests, as stated by Stephen ("Com." iii. 466), is that these communications are made "on such lawful occasions as tend to rebut the *primâ facie* inference of malice, which otherwise arises from a statement derogatory to private character." It is on the same principle that a master is protected who, when called upon for the character of a servant, charges him with a theft. In such cases, in order to support an action, there must be proof of malice beyond the uttering of the words. With a view to preserving the freedom of domestic intercourse, and from a belief that the testimony of near relatives in favor of each other was worthless, and that the only effect of examining them against each other was to tempt them to commit perjury, it was formerly the habit to reject them as witnesses. The practice in England, for a long time, however, has been to admit, and even to exact their evidence, making allowance, in appreciating its value, for the circumstances in which they are placed. The same principle has latterly been followed in Scotland; and the only exceptions which have been retained by the law of Evidence, Acts 15 and 16 Vict. c 27, 16 and 17 Vict. c. 20, to the now almost universal admissibility of witnesses, are, that neither the parties themselves, nor their husbands or wives, shall be competent or compellable to give evidence in criminal proceedings in which they are accused, nor to answer questions in a civil suit tending to criminate themselves or each other, or to reveal matters which they have communicated to each other during marriage. The C. of such communications remains although the marriage has been dissolved by death or divorce (Dickson, p. 924).

From very early times, so early, it is said, as the 4th and 5th centuries, the "Seal of Confession" (*sigillum confessionis*) was held to be inviolable, and no priest could be called upon, under any circumstances, to reveal facts which had been confided to him under its sanction. To this the case of treason was an exception, in England, even in Roman Catholic times (Best's "Law of Evidence," p. 737). In Roman Catholic countries, the privileges of the confessional remain unaltered; and several

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of the Protestant churches of Germany having sanctioned the practice of confession, the privilege of secrecy has been extended to it, as a necessary consequence, by the civil power. In these states, however, in addition to imposing far lighter penalties upon those clergymen who shall break the seal, the duty of doing so is enforced in all cases in which the confession has reference to a future crime. In England, no special privilege whatever is extended to the Roman Catholic confessional; and the question as to how far a confession made to a clergyman for the purpose of obtaining spiritual comfort and consolation is protected, was long considered doubtful. The rule has, however, been settled for some time that no clergymen of any religious persuasion are entitled to the same privilege as legal advisers; though it has often been advocated as advisable to extend the rule to clergymen, including Roman Catholic priests. In Scotland, however, the point has never been directly or solemnly decided, evidence of the kind in question, when not indispensable for the ends of justice, being generally either withheld or withdrawn (Dickson, ii. p. 938). By a statute of the state of New York, United States, ministers of the Gospel, and priests of every denomination, are forbidden to disclose confessions made to them in their professional character; and a similar statute exists in Missouri. It has been decided in England, that communications to a medical man, even in the strictest professional confidence, are not protected from disclosure (Best, 784); and the same is the case in Scotland (Dickson, ii. p. 940); but a contrary rule has been adopted in several of the states of America (1 Greenl., § 248, note).

CONFIRMATION, in English Law, is where the party having right to land, grants to the party having possession that which is in him. Confirmation, in Scots law, is the form in which a title to administer is conferred on the executor of a person deceased. It must be gone through, or "expede," before the commissary of the district.

CONFIRMATION, a Latin word which signifies *strengthening*. In the ancient church the rite so named was administered immediately after baptism, if the bishop happened to be present at the solemnity, which is still the custom in the Greek and African churches. In the Roman Catholic Church, for the last 300 or 400 years, the bishops have interposed a delay of seven years after infant baptism; in the Lutheran Church, the rite is usually delayed for from 13 to 16 years; and in the English Church, from 14 to 18 years. There is, however, in the latter church no limit to the period. C. may be administered at an earlier period, if a family is about to emigrate; and persons are confirmed up to 60 or 70, if they choose. The ceremony consists in the imposition of hands by the bishop, accompanied by an invocation of the Holy Ghost as the comforter and strengthener. But both in the Lutheran and English Churches, the ceremony is made the occasion of requiring from those who have been baptized in infancy, a renewal in their own persons of the baptismal vow made for them by their godfathers and godmothers, who are thereby released from their responsibility. None can partake of the Lord's Supper, in these churches, unless they have been confirmed. In the Roman Catholic Church, C. is held to be one of the seven sacraments, and in its administration, unction and the sign of the cross are used; and instead of the imposition of hands, the person confirmed receives a little blow on the cheek, to remind him that he must in future suffer affronts for the name of Christ. In the English Thirty-nine Articles, C. is declared not to be one of the sacraments, and the above ceremonies have been discontinued since the Reformation.

CONFISCATION, forfeiture of lands or goods to the crown, as part of the punishment for certain crimes. See ESCHEAT.

CONFLICT OF LAWS. On the breaking up of the Roman Empire into separate kingdoms, as many systems of jurisprudence more or less dissimilar, arose and were administered side by side. But owing to commercial intercourse and intermarriage, many persons held property in more countries than one; many possessed two nationalities by birth, and more than two—if nationality could be acquired by residence and interest in a foreign state. In such circumstances it often became an object of the utmost importance to individuals to ascertain, and of the greatest difficulty to lawyers to determine, whether the laws of one state or of another were to

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govern questions of sale, succession, status and the like. As no state could vindicate its jurisdiction beyond its own boundaries without being guilty of an act of aggression, it became absolutely indispensable that certain general rules should be fixed upon in order to prevent the danger of national hostilities on trifling occasions. The elaboration of these rules constituted a new branch of jurisprudence, to which the title of the C. of L. has been given, but which would be more accurately described as the rules for the solution of that conflict. From the partially independent character which belongs to the different states which constitute the American Union, the labors of the continental jurists in international jurisprudence have been carefully adapted to the requirements of that country, and it is consequently to America and to continental Europe rather than to the writers of our own country, that we must look for works of importance on this subject. By American writers, the term of C. of L. has usually been confined to that branch of the law of nations which treats of the rights and duties of private individuals, and it is consequently synonymous with what elsewhere is called private international law, under which head its various rules will be enumerated in this work. See INTERNATIONAL LAW, PRIVATE, COMITY OF NATIONS. See Story's "Conflict of Laws."

CONFO'RMABLE STRA'TA are beds which lie parallel to each other.

CONFRONTE, in Heraldy, means facing or fronting one another. It is the same as combatant.

CONFU'CIUS, a celebrated Chinese sage, was born 19th June 551 B.C., at Shangping near the town of Tséuse, in the petty kingdom of Lu. His own name was Kong, but his disciples called him Kong-fu-tse (i. e., "Kong, the Master and Teacher"), which the Jesuit missionaries Latinised into Confucius. His mother used to call him Kiéu ("little hillock"), because he had an unusual elevation on the top of his forehead, with which he is often represented. Various prodigies, as in other instances, were, we are told, the forerunners of his birth. An illustrious pedigree has also been invented for him by his fond disciples, who derive his origin from Hoang-ti, a mythological monarch of China who flourished more than 2,000 years B. C. His father, Shuh-leang-ho, died when C. was only three years of age, but he was very carefully brought up by his mother, Yan-she, and from his earliest years, displayed an extraordinary love of learning and veneration for the ancient laws of his country. The prudence, rectitude, and philosophic gravity of his conduct while a boy, are also highly extolled by Chinese writers. At the age of 17, he was made an inspector of the corn-marts, and distinguished himself by his industry and energy in repressing fraud, and introducing order and integrity into the whole business. When only 19, C. married, but divorced his wife four years after marriage, that he might have more time for study and the performance of his public duties. C. was next appointed inspector-general of pastures and flocks, and the result of his judicious measures, we are told, was a general improvement in the cultivation of the country and the condition of the people. The death of his mother, which happened in his 23d year, interrupted for a time his administrative functions, and gave occasion to the first solemn and important act of C. as a moral reformer. According to the ancient, but then almost forgotten laws of China, children were obliged to resign all public employments on the death of either of their parents; and C., desirous of renewing the observance in his native land of all the practices of venerable antiquity, did not fail to conform to this long neglected enactment. The solemnity and splendor of the burial ceremony with which he honored the remains of his mother (another old custom which had fallen into disuse), struck his fellow-citizens with astonishment, and they determined, for the future, to bury their dead with the ancient honors. Their example was followed by the neighboring states, and the whole nation, except the poorest class, has continued the practice to the present day. C. now came to be looked upon as an authority in regard to the past, and ventured to speak as such. He inculcated the necessity of stated acts of homage and respect towards the dead, either at the grave, or in part of the dwelling-house consecrated for the purpose. Hence, "the hall of ancestors," and anniversary feasts of the dead, which now distinguish China as a nation. C. did not end here. He shut himself up in his house to pass in solitude the three years of mourning for his mother, the whole of which time he dedicated to philosophical study. We are told that he reflected deeply on the eternal laws of morality, traced them to their

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source, imbued his mind with a sense of the duties which they impose indiscriminately on all men, and determined to make them the immutable rules of all his actions. Henceforth, his career is only an illustration of his ethical system. He commenced to instruct his countrymen in the precepts of morality, exhibiting in his own person all the virtues he inculcated on others. Gradually his disciples increased, as the practical character of his philosophy became more apparent. After his "years of mourning" and meditation were over, C. travelled through various states, in some of which he was employed as a public reformer. On his return to Lu, his reputation was very great, not less than 500 mandarins being among his followers. In fact, it is to be observed, that generally C.'s disciples were not the young and enthusiastic, but men of middle age, sober, grave, respectable, and occupying important public situations. This fact throws light both on the character and design of his philosophy. It was *ethical*, not *religious*, and aimed exclusively at fitting men for conducting themselves honorably and prudently in this life. C. now divided his scholars into four classes: to the first he taught morals; to the second, rhetoric; to the third, politics; and to the fourth, the perfection of their style in written compositions. While residing at Lu, C. worked industriously in the revision and abridgment of those works which constituted the principal monuments of that ancient literature about which he was always speaking in the language of unbounded reverence.

An unworthy change of magistrates, however, in the kingdom of Lu induced C. to recommence his travels. He first proceeded to Chen, where he was not much appreciated; and afterwards to Tze, where he became one of the king's ministers, but was dismissed after a short time through the intrigues of cunning courtiers. On his return to Lu, he was appointed "governor of the people." For a time, his inflexible virtue awed them into morality, and the delighted monarch conferred the highest diguities on the philosopher; but the arrival of a bevy of beautiful syrens from a neighboring state, which hated the increasing purity of Lu, suddenly overturned the edifice of morality which C. was constructing; and in despair he again went abroad in search of less vacillating disciples. His later wanderings were very unpropitious; state after state refused to be improved. He was in some instances persecuted; once he was imprisoned, and nearly starved; and finally, seeing no hope of securing the favorable attention of the mass of his countrymen while alive, he returned in extreme poverty to his native state, and spent his last years in the composition of literary works by which posterity at least might be instructed. He died 479 B.C., in the 70th year of his age. Immediately after his death, and notwithstanding the general demoralisation of his contemporaries, C. began to be venerated, and succeeding ages adorned his name with golden epithets. His family, which has continued to the present day, through more than 70 generations, in the very place where their ancestor lived, is distinguished by various honors and privileges, being the only example of heridetary aristocracy in China, while in every city down to those of the third order there is a temple to his honor. The 18th day of the second moon is kept sacred by the Chinese as the anniversary of his death.

The system of C. is, rightly considered, the most faithful expression of the Chinese mind, although it is neither the oldest of the extant Chinese religions, nor that which can claim the greatest number of adherents. We have termed it a *religion*, but it ought rather to be regarded as a system of social and political life built upon a slight foundation of philosophy. It contains no trace of a personal God. There are, indeed, a number of allusions to a certain heavenly agency or power, *Shang-te*, whose outward emblem is *Tien*, or the visible firmament; but this Shang-te, in the opinion of the most enlightened Chinese scholars, is nothing more than a verbal personification of "the ever present Law and Order and Intelligence, which seem to breathe amid the wonderful activities of physical creation. In the measured circuit of the seasons, in the alternation of light and darkness, in the ebb and flow of tides, and in the harmonious and majestic revolutions of the heavenly bodies." Sometimes, indeed, C. uses language that might seem to imply more than this. In one of the sacred books, Shang-te is depicted as possessing a high measure of intelligence, and exercising some degree of moral government: he punishes the evil, rewards the good, and is honored with sacrifice. Immediately after, however, we are informed that his retinue consists of the six Tsong, the mountains, the rivers, and the spirits generally. Elsewhere, the people are enjoined "to contribute

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with all their power to the worship of Shang-te, of celebrated mountains, of great rivers, and of the 'shin' (spirits) of the four quarters." Hence we are forced to the conclusion, that C. no more believed Shang-te to be a personal being, than he believed the mountains to be such; and that in describing this Power as possessed of intelligence, and as exercising a moral government, he simply spoke in a pictorial and symbolic way of the laws that govern all things. Perhaps, itoo, a dim consciousness of a mysterious inexplicable *life* pervading the phenomena and operating through the laws of nature—a feeling probably absent from no human soul—influenced C to use words which his understanding would not have interpreted in a very literal manner. His highest conception of God, therefore, only reminds one of the *anima mundi* of the classical philosophy; and even this conception is not always present. More than once, his language indicates doubt as to the existence of this great abstraction, and he occasionally "reprimanded his disciples for prying into matters unconnected with their duties and lying far beyond their depth." In fact, from metaphysics and theology he equally shrunk. The idea of a creation out of nothing by an infinite and eternal Person, to the end that the glory of his perfections might be seen and felt through the magnificence of material symbols by those intelligences whom, in his beneficent condescension, he had deigned to create, is utterly unknown to Confucius. He looked on the universe rather as a stupendous, self-sustaining mechanism. He thought that all things existed from eternity, and were subject to a flux and reflux, in obedience to initial laws impressed upon them, how and why, we know not, by some stern necessity. Thus, chaining to the earth, as it were, "those thoughts that wander through eternity;" crushing, in fact, every spiritual tendency of human nature, by repudiating all speculation, and well-nigh all philosophic investigation of every kiud, C. strove to direct the attention of men to the duties of social and political life. "I teach you nothing," he says, "but what you might learn yourselves—viz.: the observance of the three fundamental laws of relation between sovereign and subject, father and child, husband and wife; and the five capital virtues—universal charity, impartial justice, conformity to ceremonies and established usages, rectitude of heart and mind, and pure sincerity." This, in fact, contains the whole doctrine of C.; and it was unquestionably well suited to the prosaic, practical, and conservative mind of the Chinese. It was by the strict and faithful performance of appointed duties, and by the cultivation of proper feelings and sentiments, that C. believed wisdom or knowledge could alone be obtained. He seems to have entertained no doubt that the great virtues of charity, justice, and sincerity might be developed without the help of any spiritual or religious faith, by a species of mechanical discipline. They were natural to the mind, he thought, just as their opposites were unnatural. Here, again, we find a striking example of that easily satisfied unphilosophic *materialism* which characterised C., and has since leavened the Chinese nation so thoroughly. He virtually says: "Just as I am forced to accept the phenomena of the universe as *facts*, though I can give no explanation of their origin, so am I forced to accept the phenomena of the human mind as *facts*, though I can give no explanation of *their* origin." C. finds evil and good, wisdom and folly, in the hearts of men. He cannot help making this distinction; some things are bad, others good; such is the oracular utterance of his conscience, which he terms "the light of intelligence." He does not, however, advance a step further, and make this moral conviction the basis of a religion. His "good" has no connection with any God. It exists; we are forced to recognise it as such; that is all we can know. Cultivate it. Those great laws of nature about which we know nothing except that they are realities, are on its side. Do not foster what you know to be mean and unworthy, for "he who offends against Heaven has no one to whom he can pray." "Imperial Heaven will only assist virtue." From this stand-point, C. taught a simple and comprehensive rule of life, both private and public. First, let every man govern himself according to the sacred maxims; then his family according to the same; and finally, let him render to the emperor, who is the father of his people, such filial obedience as he demands of his own children, and worship him with the same veneration as he does his own ancestors; for thus will domestic peace, social order, and the safety of the commonwealth be preserved. To further this end (and in accordance with his belief that by instruction in the sacred precepts everything desirable could be accomplished), C. incalcated the necessity of universal

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education, and, in consequence, schools are diffused throughout the length and breadth of the empire, penetrating even to the remotest villages, where the maxims of the philosopher are taught, whose influence is thus perpetuated from generation to generation.

Confucianism appeals to "practical" men. It lauds the present world; rather doubts, than otherwise, the existence of a future one; and calls upon all to cultivate such virtues as are seemly in citizens—industry, modesty, sobriety, gravity, decorum, and thoughtfulness. It also counsels men to take part in whatever religious services have been established from of old. "There may be some meaning in them, and they may affect your welfare in a way you do not know of. As for the genii and spirits, sacrifice to them: I have nothing to tell regarding them, whether they exist or not; but their worship is part of an august and awful ceremonial, which a wise man will not neglect or despise." Confucianism, in consequence, almost immediately after the death of its author, became the religion of the state, to which it has proved an admirable ally; its theory of government being nothing less than a paternal despotism. The entire literary class in China are also followers of C., and, in fact, for many ages the literature of China has consisted exclusively of commentaries on the five canonical books which C. professed to merely abridge, and of four others, which were composed partly by himself and partly by his disciples, and which, together with the former, constitute the nine Chinese classics.

The five canonical books are the "Yih-king,"—originally a cosmological essay, now, curiously enough, regarded as a treatise on ethics; the "Shu-king"—a history of the deliberations between the emperors Yaou and Shun, and other personages, called by C. the *Ancient Kings*, and for whose maxims and actions he had the highest veneration; the "Shi-king"—a book of sacred songs, consisting of 311 poems, the best of which every well-educated Chinaman gets by heart; the "Le-king"—the Book of Rites, the foundation of Chinese manners, prescribing, as it does, the ceremonies to be observed in all the relationships of life, and the great cause of the unchangeableness and artificiality of Chinese habits; and the "Chun-tsien"—a history by C. of his own times, and those which immediately preceded him. The first of the "Four Books" is the "Ta-hëo," or "Great Study," a political work, in which every kind of government, from the domestic to the imperial, is shewn to be essentially the same—viz., parental; the second is "Chung-yung," or "the Invariable in the Mean," a book devoted to teaching men what is "the due medium," or the golden mean, to observe in their conduct; the third is the "Tun-yu," or "Philosophical Dialogues," containing the recorded conversations of C., and the best book for obtaining a correct knowledge of his character; and the fourth is the "Hi-tse," written by Meng-tse or Mencius, who died 317 B.C., and who was by far the greatest of the early Confucians. The main object of this work is to inculcate philanthropic government.

It is proper to observe, in conclusion, that in the course of centuries the defects of the system of C. made themselves felt even to the unspiritual Chinese mind; and the necessity of "speaking out far more plainly, not on matters of finance, economy, and etiquette, but on the nature of the world and its inhabitants, and the true relation of the seen and temporal to the absolute and the all-embracing, was recognised. The philosopher who guided this great movement to a prosperous close was Tehu-he (died 1200 A. D.), is termed by European scholars the Chinese Aristotle, and regarded by all the governing class in China as "the prince of science." His innumerable works are laboriously studied by the higher literary class, and are considered the standard of metaphysical or religious orthodoxy, but the mass of ordinary Confucians never pass beyond the ceremonial ethics of their master.

For further information regarding Confucius and his system, see article CHINESE EMPIRE.

CONGÉ D'ÉLIRE (Norman-French), the name given in England to the king's warrant or permission to a dean and chapter to proceed to the election of a bishop to a vacant see. Since the passing of the statute 25 Henry VIII. c. 20, the C. d'É. has always been accompanied by a letter-missive from the king, mentioning the person to be elected by name, so that in reality it is a nomination by the crown. If the dean and chapter delay the election beyond twelve days, the nomination is effected by letters-patent from the crown; if they delay beyond twenty days, or

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elect another than the person named, they incur the penalties of a *præmunire*, i. e., loss of civil rights, forfeiture of their goods, and imprisonment during the royal pleasure.—Stephen's "Commentaries," vol. iii. p. 8.

CO'NGER, or Co'nger-eel (*Conger*), a genus of marine fishes of the eel family (*Muræniдæ*), having the tail more elongated and pointed than the fresh-water eels, the dorsal fin commencing much nearer the head, and the teeth of the upper jaw, although slender, placed so close together as to form a cutting edge. The species are not numerous. One only (*C. Vulgaris*), is a native of the British seas. It is common on all parts of the coast, and is found both among rocks and on banks. Its form much resembles that of a fresh-water eel; its color is brown above, passing into dull white beneath; the fins whitish, edged with black; and the lateral line almost white. It attains a large size, often five or six feet long; sometimes ten feet, and eighteen inches in circumference, weighing more than one hundred pounds. It possesses great strength, and is a formidable antagonist when hauled into a boat by the fisherman's line, or found among the rocks, where it is sometimes left by the retiring tide. Great numbers are, however, taken in order to be used as food, although not highly esteemed, and chiefly consumed by the poorer classes. The principal C. fishery of Britain is on the Cornish coast, and it is not uncommon for a boat with three men to bring on shore from a ton to two tons as the produce of a night's fishing, the C. being caught most readily during the night; but there are banks off the French coast still more productive. Sand-launces, pilchards, &c., are used for bait. The C. is extremely voracious.

CONGE'STION OF BLOOD, also called Fulness of Blood, Vascular Turgescence, Hyperæmia (*hyper*, excess; *aima*, blood), is a condition to which probably far too much importance has been attached by medical writers. Congestions are described as being either *active* or *passive*. But active congestions are always essentially parts of a further morbid process, such as inflammation (q. v.), tumor (q. v.), or softening of texture: while passive congestions are almost always determined by some mechanical cause of obstructed or retarded circulation. It results from this view of its pathology, that congestion alone can hardly ever require treatment, or be anything else than one among other indications of disease.

Congestion may be defined to be "excess of blood in the vessels of a part, with diminished motion of that blood." The chief causes of congestion may be classed under the two heads of (1) congestion from venous obstruction, and (2) congestion from want of tone in the vessels.

1. *Congestion from venous obstruction* is easily illustrated by tying up the arm, as is done before opening a vein, when the veins are compressed more than the arteries. If the ligature is kept on for a sufficient time, the veins swell, the fingers become red, and then livid, and the whole limb is swollen. Cold applied to the surface of the body acts similarly on it, and contracts the veins more rapidly than the arteries, which lie deeper; and the purple color of the hands and face after exposure to cold shews the congested state of the capillaries. "Congestions," says Dr. C. J. B. Williams, "are caused in external organs by an obstruction of the veins leading from them. Thus, congestion of the brain may be produced by a tight cravat or by a tumor pressing on the jugular veins. Efforts of straining, coughing, holding the breath, and asthmatic paroxysms which impede the flow of blood through the lungs, cause congestion in various parts. Tubercles in the lungs cause congestion of that organ. Obstruction to the transit of blood through the liver causes congestion in the abdomen, hæmorrhoids, &c.—"Principles of Medicine," 2d ed., p. 180.

2. *Congestion from want of tone in the vessels* includes a numerous class of cases. In atony of the vessels generally, as in extreme debility, certain fevers, &c., there is general congestion of the parenchymatous organs—the lungs, liver, &c.—and the blood gravitates to the lowest parts, giving rise to what is termed *hypostatic* congestion of the posterior parts of the lungs, the skin of the back, &c. In other cases, the weakness is local, as when the feet swell after long standing, in consequence of over-distension of the veins. Similarly, a continued stooping posture may occasion headache, giddiness, and the other symptoms of congestion of the brain. Congestive affections of this kind are often mistaken for inflammation, and instead of being treated by tonics, are treated by depletion, which, although affording temporary relief, increases the evil.

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Another cause of congestion is over-excitement of the vessels, and this often occurs at an early stage of inflammation, or as a result of that process.

We must pass over the symptoms and effects of congestion, because they vary very much according to the organ affected, and shall conclude with a few words on the general remedies for congestion. First in order, we must notice such as remove the cause, as the loosening of a ligature or the removal of a tumor compressing veins, elevation of the head in affected brain, and the recumbent position in congestion of the hæmorrhoidal or uterine vessels. Pressure, by supporting the weak vessels, and friction, by increasing the onward movement of the blood in the veins, are often of great use. Astringents, such as solutions of alum, sulphate of zinc, tannin, oak-bark, &c., may be applied with advantage locally to certain parts, as the eye, throat, rectum, &c.; and stimulants may be similarly used, as a capsicum gargle to a relaxed sore throat. Medicines of these classes may also be given internally. Thus, the principal action of bark, quinine, and arsenic in the cure of ague is supposed to lie in their reducing the great visceral congestion that is always present. A glass of strong hot brandy and water will often remove a congestive headache, and a stimulant draught will often relieve the pulmonary congestion which follows a fit of asthma. Various remedies are supposed to have a special power of removing the congestion of certain organs: thus, mercurials are recommended for congestion of the liver; digitalis and cantharides for congestion of the kidneys; and squills, benzoin, and the balsams for bronchial congestion.—For further details, the reader is referred to the excellent work of Dr Williams, from which we have quoted.

CO'NGLETON, a market-town in Cheshire, picturesquely situated in a deep valley, on the Dane, 33 m. e. of Chester. It is a mile long, with many houses built of wood and plaster, and has silk spinning and throwing, with manufactures of silk ribbons, &c. There are coal-mines near. Pop. (1871) 11,344.

CONGLO'MERATE, or Plumpu'dding-stone, a rock consisting of round, water-worn pebbles, compacted together into stone. These pebbles consist of portions of hard rock, frequently of quartz. They can sometimes be traced to their parent rock. Their rubbing and polishing must have been a work of considerable time, but their deposition in the beds in which they occur has been performed speedily, the materials having been brought together by a strong current. They are united together by a silicious, calcareous, or ferruginous cement, sometimes so loosely, that they are easily separated by a slight blow from a hammer; at other times, the matrix is as hard as the pebbles which it contains, and clasps them so firmly, that the rock breaks, as if it were a homogeneous mass. The pebbles vary in size, occasionally being several feet in diameter; but they are generally about the size of, or smaller than a walnut.

CO'NGO in the widest sense of the name, includes all the countries on the west coast of Africa lying between the equator, and lat. 18° s.; but more definitely the name is given to the territory lying between the rivers Dando and Congo, or Zaire—i. e., between about lat. 8° 20' and 6°s.—The great central African river, the Congo, has of late usurped much of the interest formerly reserved for the Nile and its exploration. At its mouth on the Atlantic seaboard the Congo is an immense body of water, near 10 m. wide and over 160 fathoms in depth. Its upper course remained unknown till Mr Stanley identified the Congo with the Lualaba, and so connected it immediately with the great system of lakes south and west of Lake Tanganyika, and less directly with Tanganyika (q. v.) itself. The former chain of lakes, examined by Livingstone in the hope that here he might finally fix the sources of the Nile, were long suspected to drain towards the Congo—a suspicion confirmed by Cameron. But Mr. Stanley and his followers, striking the Lualaba (known higher up as Chambezi and Luapula) at Nyangwe in Nov. 1876, followed its course persistently in the face of enormous difficulties, fighting no less than thirty-two battles; till in August 1877 he found it, after "changing its name scores of times," reach the Atlantic as Congo, Kwango, and Zaire. The Lualaba-Congo, interrupted to the north of Nyangwe by cataracts and rapids, flows northward from the lake region to about 2° n. of the equator (where it is already "a broad stream, from two to ten miles wide, studded with islands"); then its course changes to n. w., w., and finally to s. w. "As the river runs through the great basin which lies between e. long. 26° and e. long. 17°, it has

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an uninterrupted course of 1400 miles, with magnificent affluents, especially on the southern side. Thence, cleaving the broad belt of mountains between the great basin and the Atlantic Ocean, it descends by about thirty falls and furious rapids to the great river between the falls of Yellala and the Atlantic."—The natives of the country of C. and the bordering lands speak one copious and harmonious negro-language; they are good-natured and hospitable, but very indolent. Their Christianity, early derived from Portuguese missionaries, is of the most superficial kind. The population in the interior is supposed to be dense.—See Burton's 'Two Trips to Gorilla Land" (1876); Cameron's "Across Africa" (1877); and Stanley's account of his journey.

CONGOO'N, or Kongun, a town of Persia, on the Persian Gulf, 130 miles south of Shiraz. It has an excellent and safe roadstead; and both wood and water, which are generally scarce in the gulf, may be obtained here. Pop. 6000.

CONGREGA'TION (Lat. *con*, together; *grex*, a flock), an assembly, generally a religious assembly; in its most ordinary use, an assembly of Christians met in one place for worship. See CHURCH.—In the Roman Catholic Church, it often designates a sort of board of cardinals, prelates, and divines, to which is intrusted the management of some important branch of the affairs of the church. Thus, the *C. of the Index* examines books and decides on their fitness for general perusal. See INDEX. The *C. De Propaganda Fide* consults as to the advancement of the Roman Catholic religion throughout the world. See PROPAGANDA. The *C. of Relics* inquires into the genuineness of supposed relics. The *C. of the Holy Office* takes cognizance of heresies, &c. See INQUISITION. The *C. of Rites* regulates the festivals and offices of new saints. There are numerous other congregations.

CONGREGA'TIONALISTS. See INDEPENDENTS.

CO'NGRESS, an assembly either of sovereign princes, or of the delegated representatives of sovereign states, for the purpose of considering matters of international interest. Even in America, though the term has now a different meaning (see UNITED STATES), it has a similar origin, the first C. being that of the delegates from the various British colonies, who met on the 7th October 1765, for the purpose of considering their grievances. In like manner, in Belgium, on the 4th October 1830, a C. of deputies from the different provinces was held for the purpose of adjusting the new constitution. Previous to signing a treaty of peace, a meeting of plenipotentiaries usually takes place, to which the name of a C. is sometimes applied, though it seems more properly to be reserved for those more important meetings at which extensive schemes of future policy are determined on, and the balance of power amongst the various European states readjusted. To this class belonged the famous C. of Vienna in 1815; the C. of Carlsbad, in 1819, for regulating the affairs of Germany; the Paris C. at the termination of the Russian war of 1854—56; the memorable C. at Berlin after the Russo-Turkish war of 1877–78; and many others. As the envoys to a C. are not sent to one sovereign in particular, a modification of the ceremonial recognised by the law of nations for the recognition of ambassadors takes place. There is no presentation of credentials, but in place of it an exchange of the full powers or warrants of the respective members. If a meditator has been appointed, it is to him that the letters of credence, and notes and counter-notes, are addressed, and by him that the negotiations are directed. There is scarcely any difference between a C. and a diplomatic conference—such, for example, as that of London in 1826, for determining the fate of Greece.

CO'NGREVE, William, the second son of Richard Congreve, Esq., of Congreve and Stretton, was born about 1672, at Bardsey, Yorkshire. Educated at Kilkenny, and at Trinity College, Dublin, he in 1688 returned to England, and was entered at the Middle Temple, but he does not seem to have taken kindly to law. His first publication was a novel, entitled "Incognita, or Love and Duty Reconciled," a performance which Dr Johnson said he would rather praise than read, but which has been neither read nor praised by succeeding critics. His first play, "The Old Bachelor," was produced at Drury Lane when C. was in his 19th year, and its success was remarkable. Next year he came out with the "Double Dealer," which was a comparative failure; but his comedy "Love for Love," published in 1695, was a great success, and brought to its author money and fame. "The Mourning Bride," a blank-verse tragedy, written after the manner of the old passionate mas-

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ters, came out in 1697. Its success was enormous, far exceeding that of his comedies, but it has long since fallen from its high estate. Two years after, he produced his comedy, entitled "The Way of the World," which failed completely, and disgusted him with the theatre. In other respects, C. was a fortunate man. He held various offices, which together yielded him an income of £1200. C. affected to despise his theatrical triumphs, and cultivated the modish airs of the fine gentleman, an eccentricity which laid him open to rebuke when he was visited by Voltaire. In his later days, he was afflicted by gout and blindness. He died 19th of January 1729, at his house at Surrey Street, in the Strand, London, at the age of 57, and was buried in Westminster Abbey, nobles supporting the pall.

As a writer of comedies, C. takes a high place, but not the highest. His plots are intricate and confused, and his dialogue is defiled by all the grossness of his age. He has none of those touches of nature that make the whole world kin. The element in which he moves is intrigue. His world is composed of wives, gallants, and husbands; and the wives and the gallants are in a continual conspiracy against the husbands. What strikes the reader of these plays, is the superabundant wit. But there is no discrimination or keeping in the brilliancy. The shoeblack is as witty as the hero. C. has so many good things to say, that he is glad to get a mouth to stick them in. He is the wittiest and least amusing of writers. He has no heart, no generosity, no humor. His splendor is frosty, and the innumerable flashing points dazzle the eye, and make the brain ache.

CONGREVE ROCKET. See ROCKET.

CO'NGRUOUS. In Geometry the term congruity is applied to lines and figures which exactly correspond when laid over one another. See COINCIDENCE.

In arithmetic, two numbers are said to be C., with respect to a third, when their difference is exactly divisible by it. Thus, 12 and 7 are C. with respect to 5, as $\frac{12-7}{5} = 1$, and so are 27 and 12, as $\frac{27-12}{5} = 3$. The numbers considered must be whole numbers. When two numbers are C. to a third, either is called a *residual* of the other with respect to the third. C. numbers possess many curious properties, which have been applied by Gauss and other writers in the investigation of the properties of numbers.

CO'NI, or Cune'o, capital of a province of the same name in the kingdom of Italy, stands at the junction of the Stura and the Gesso, in a pleasant, fruitful, and well-cultivated district, 48 miles south-west of Turin. Pop. (1871) 11,860. The principal street is handsome, with arched piazzas; and there are several large churches, convents, and palaces. Its chief manufactures are silk and woollen cloth. Owing to its position on the road between Nice and Turin, it enjoys a brisk traffic, and is the entrepôt for merchandise from Nice destined for Lombardy, Switzerland, and Germany. Two well frequented fairs are held. C. was once a fortified place, and had to undergo several sieges. After being taken and retaken, the victory of Marengo gave it into the hands of the French, who demolished the fortifications, and turned them into promenades.

CO'NIC SECTIONS. See CONE, CIRCLE, ELLIPSE, PARABOLA, and HYPERBOLA.

CONI'FERÆ (Lat. cone-bearers), an important natural order of exogenous plants, containing the pines, firs, juniper, yew, &c.; agreeing with the other exogenous orders generally in the structure of the stem and in the mode of vegetation, but differing remarkably from most of them in having naked ovules—i. e., ovules which are not enclosed in an ovary, but are fertilized by the direct application of the pollen to the *foramen*, without the intervention of style or stigma—and upon this account separated from them, along with *Cycadaceæ* (q. v.), by Lindley, Endlicher, and others, as a distinct class, under the name *Gymnogens* or *Gymnospermæ*. The flowers are unisexual, the male and female sometimes on the same, sometimes on separate plants; the male flowers have either one stamen or one bundle of stamens, the anthers often crested; the female flowers are in cones or solitary; the place of ovaries is supplied by the flat scales of the cones, the ovules are usually in pairs on the face of the scales, either inverted or erect. The fruit is either a cone—

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the scales of which sometimes become fleshy, and are incorporated into a berry-like fruit—or a solitary naked seed. The seed has a hard crustaceous integument; the embryo is in the midst of fleshy oily albumen; the cotyledons are either two, or numerous and whorled. The mode of branching is peculiar, numerous buds proceeding from the side of the main stem so as generally to form whorls of branches, which are generally almost horizontal in their direction, whilst the central vertical shoot runs up often with admirable straightness and some of the C. attain a height unrivalled among other forest trees, of which the *Wellingtonia* (q. v.) of California affords the most noble example. The wood consists of *punctated* cells; the sides of the tubes or elongated cells which form it, and which are nearly of equal diameter, being marked by circular discs, which, when highly magnified, exhibit a small internal circle surrounded by a larger external one. This peculiarity of the wood of the C. is important, as enabling us to recognize it in a fossil state, and to refer many fossils, particularly of the coal formation, to this order. The leaves of the C. differ very widely from those of the closely allied order *Cycadaceæ*. Most of the C. have very narrow veinless leaves, so that the Germans call them *Needle-Woods* (Nadelhölzer) in contradistinction to the other European forest-trees, which they call *Leaf-Woods* (Laubhölzer). By far the greater number of them belong to the northern hemisphere. The C. are very long-lived; some of them are supposed to be capable of attaining an age of 2000 or 3000 years. When the stem of a coniferous-tree is cut across, it does not sprout again from the root. The C., besides the great usefulness of the timber of many, are remarkably productive of Turpentines (q. v.) and Resins (q. v.). Astringent substances are also found in their bark, and fixed oil in their seeds. The seeds of some species of *Pine* and *Araucaria* are used as food.

The C. are divided into—1. *Abietineæ*, having inverted ovules and woody cones, as the pines, firs, larch, cedar, araucaria, &c. 2. *Cupressineæ*, with erect ovules, and either woody or fleshy cones, as the juniper, arbor-vitæ, cypress, &c. 3. *Taxineæ*, with solitary seeds, as the yew, gingko, &c. 4. *Gnetaceæ*, plants of comparatively humble growth, with jointed stems, often regarded as forming a distinct order. See SEA-GRAPE. Lindley and others also make the *Taxineæ* a distinct order. See YEW.

CONIRO'STRES, a tribe or section of the order of birds called *Insessores*, and characterised by a strong conical bill, without notches. The feet are, in general, adapted for walking on the ground, as well as for perching. The bill varies much in its thickness, and those species in which it is thickest, in general feed most exclusively on seeds. The number of birds belonging to this tribe is very great; and the families differ much in many respects. Among them are finches, sparrows, buntings, linnets, larks, plantain-eaters, colies, crows, birds-of-paradise, starlings, and even hornbills.

CO'NIUM. See HEMLOCK.

CO'NJUGAL RIGHTS. See MARRIAGE.

CONJUGA'TION (Lat. a connecting or yoking together), a term in Grammar applied to a connected view or statement of the changes of form that a Verb (q. v.) undergoes in its various relations. See INFLECTION. The forms usually included under this term are those that serve to mark: 1. *Person*, or the distinction between the speaker, the spoken-to, and the spoken-about; as, (I) *write*, (thou) *writest*, (he) *writes*. 2. *Number*; as (John) *writes*, (they) *write*. 3. *Tense*, or time; as (I) *write*, *wrote*, *have written*, *will write*. 4. *Mood*, or the manner in which the action is presented. When the action is simply asserted, it is the Indicative mood, as (he) *wrote*; when put as a supposition or condition it is the Conditional mood, as, *if he wrote*. The Potential mood expresses the power of doing the action, as, *he can write*; and the Imperative commands the doing of it—*write*. The Infinitive mood expresses the action without limitation of any kind—*to write*, as it makes no affirmation, it is, strictly speaking, not a verb, but a kind of abstract noun. The two participles, the one expressing the action as in progress (*writing*), the other as completed (*written*), may be classed with the infinitive, as not affirming anything. In opposition to the infinitive and the participles, the other parts of the verb are called Finite. 5. *Voice*, or the distinction between Active and Passive (see VERB); as (he) *wrote* (the letter), (the letter) *was written* (by him).

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In English, and in most modern European languages, the greater part of those distinctions are indicated by separate words; in Sanscrit, Greek, and Latin, they were nearly all indicated by prefixes and affixes, or other modifications of the word itself. The nature and origin of these modifications are considered under the head INFLECTION. All verbs do not take the same changes even in the same language. Although the affixes, e. g., may have originally been the same, yet they underwent, in course of time, different kinds of corruption or obliteration, depending upon the nature of the letters in the root verb. This leads to the verbs of a language being arranged in different classes or conjugations. In Latin, for instance, grammarians recognise four conjugations, and verbs that cannot be brought into any class are called Irregular Verbs.

In English, there are two distinct types of the inflection of verbs; thus, *I love*, becomes in the past tense, *I loved*, and in the passive voice, *I am loved;* while *he shakes* becomes *he shook*, and *he was shaken*. Verbs that, like *love*, take *d* (or *ed*—sometimes *t*) in their past tense and past participle, form one class or C.; and those resembling *shake* in their changes form another. The former class is by far the most numerous; but the latter includes the most commonly used and oldest verbs in the language. The mode of change seen in *shake, shook, shaken*, is believed to be more ancient than the other, and is therefore called the Old C., and sometimes, the Strong C., the other being the New or Weak. The verbs belonging to the old C. are all of Saxon origin, and are primitive or root verbs; while derivative verbs belong to the other class. Verbs of the weak C, are pretty uniform in taking *d* or *ed*, although after certain letters the *d* is of necessity pronounced as *t*, and is sometimes replaced by that letter in writing—*dipt*. With regard to verbs of the strong C., no rule can be given as to the change of vowel by which the past tense is formed. It was made at first, no doubt, according to felt laws of euphony; and even yet a certain "method" may be discerned "in their madness." Thus:

1. Rise, rose; smite, smote; ride, rode; drive, drove, &c.
2. Cleave, clove; steal, stole; speak, spoke; tear, tore, &c.
3. Swim, swam or swum; sing, sang or sung; ring, rang or rung, &c.

For further information on the C. of English verbs, see Latham's "English Language," or Chambers's "Information for the People" (ed. 1874), vol. ii., art. "English Grammar."

CONJUGATION OF CELLS, a union of two distinct cells of a plant, in order to reproduction. It has been observed only in the *Confervaceæ* and *Diatomaceæ*. Two cells come into contact, as by two filaments of a *Conferva* being brought together, and little projections are formed from each, the points of which are absorbed, and thus a tube is formed, through which one of the cells empties itself into the other. The latter then becomes a *mother-cell*, and produces spores.

CO'NJUNCT AND CO'NFIDENT. See INSOLVENCY.

CONJU'NCTION, in Astronomy, is one of the Aspects (q. v.) of the planets. Two heavenly bodies are in C. when they have the same longitude—that is, when the same perpendicular to the ecliptic passes through both. If they have, at the same time, the same latitude—that is, if they are both equally far north or south of the ecliptic—they appear from the earth to be in the same spot of the heavens, and to cover one another. The sun and moon are in C. at the period of new moon. In the case of the inferior planets, Mercury and Venus, there is an inferior C. when the planet is between the earth and the sun, and a superior, when the sun is between the earth and the planet. In general, a heavenly body is in C. with the sun, when it is on the same side of the earth and in a line with him; and it is in *opposition* to the sun, when it is on the opposite side of the earth, the earth being in a line between it and the sun. Planets are invisible when in C. with the sun, except in rare cases, when an inferior planet passes over the sun's disk, and may be seen as a speck on his surface. Conjunctions are either *geocentric* or *heliocentric*, according as they are actually witnessed from the earth, or as they would be witnessed if observed from the sun. In observing a C. from the earth's surface, it is usual to reduce the observation to what it would be if made from the earth's centre; by this means, the exact times of C. are more accurately fixed, and the observations of one astronomer made available to every other, wherever he may be on the earth's surface. *Grand conjunctions* are those where several stars or planets are found together. The Chi-

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nese history records one in the reign of the Emperor Tchuen-hiu (2514—2436 B. C.), which astronomers calculate to have actually taken place.

CONJUNCTIONS, one of the "parts of speech," or classes, into which grammarians divide words. C. serve the purpose of connecting sentences, parts of sentences, and single words; as, "Day ends, *and* night begins. William *and* John learn Latin. Charles *and* James carried the basket between them." In the first sentence, *and* connects two separate affirmations into one compound sentence. The same is true in the second—the separate affirmations being "William learns Latin," and "John learns Latin." In the third sentence, *and* connects only the two words, "Charles" and "James," as it cannot be affirmed of either of them alone that he "carried the basket." In most cases, however, it can be shewn that, logically at least, two affirmations are involved, and that the conjunction really connects the affirmations. It is not easy to distinguish C. from adverbs. In fact, C. were all originally other parts of speech; and the greater part of them are still really adverbs, and owe their conjunctive effect to their signification as adverbs. In *and* and *but*, whatever may have been the original meaning, we now attend only to the conjunctive effect; *or* is a shortened form of the pronominal adjective *other*; and *nor* is *or* with the negative prefixed. In such a sentence as, "I believe that you are wrong," *that* is the demonstative pronoun, equivalent to—I believe *this*, viz, "you are wrong." This is clearly seen in the corresponding words in other languages: Ger. *dass*, Fr. *que*, Lat. *quod* (for the relatives were originally demonstrative pronouns.) All the rest might be called Adverbial C. or Conjunctive Adverbs. Ex., "He is industrious; *therefore* he is happy"—that is, "he is happy *for that*." This adverb, or adverbial phrase, expressive of the cause of the happiness, by referring us back for its meaning to the former assertion, has the effect of connecting the two assertions in the mind. Again, "The messenger arrived *while* he was speaking." Here *while* is equivalent to, *at the time at which* (he was speaking). As an adverbial phrase, this simply indicates the time of the act of "arriving;" but as it also expresses that the speaking was going on at the same time, it thus conjoins the two assertions.

The most important distinction among C. will be seen in the following pair of sentences:

The sun went down, *and* the moon rose.
The moon rose, *as* the sun went down.

The first (compound) sentence contains two simple sentences or assertions, linked together, yet each standing on an independent footing; the two are joined on terms of equality, and are therefore said to be *co-ordinate*, and the conjunction is called a Co-ordinating Conjunction. In the second sentence, the last clause, though a grammatical sentence, contains no logical proposition, no assertion made for its own sake, but merely states a fact as a modifying circumstance with regard to the assertion contained in the first clause. The sentence of the second clause is therefore *subordinate* to that of the first, and the conjunction that marks the relation, a Subordinating Conjunction. The chief Co-ordinating C. are:

1. *And, also, likewise, not only—but, partly—partly, first—then, further.* All these are used to tack on sentences whose sense accords with, or adds to, the effect of what goes before. Hence they might be called *cumulative* conjunctions. The following (2) mark various degrees of opposition in the sense or effect of the sentences, and might be called *adversative* conjunctions. These terms seem preferable to *conjunctive* and *disjunctive*, generally used.

2. (*a.*) *Not—but, else, otherwise* (Exclusive).
   (*b.*) *Either—or, neither—nor* (Alternative).
   (*c.*) *But, only, yet, still, at the same time, nevertheless.*

3. *Therefore, wherefore, for, thus, consequently, hence, accordingly, so, so that.* (Cause and effect.)

All other C. may be classed as Subordinating, such being their usual function. Those in most common use are: *Although, as, as well as, so—as, as—as, because, if, lest, since, than, that, in order that, though, unless, whether, when, before, after, while.*

CONJU'NCTLY AND SE'VERALLY, in the law of Scotland, corresponds to jointly and severally in England, and denotes a form of obligation by which each of several obligants becomes bound for the whole. The creditor in such circumstances has his option either to exact the obligation proportionately from each of the co-

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obligants, or to select one of them, and exact the whole from him, leaving him to seek his relief against the others.

CONJURING. See MAGIC, INCANTATION.

CONN, Lough, a lake in the north of Mayo county, Ireland, and with Lough Cullin (from which it is separated by a narrow neck of land), 13 miles long, and 1 to 3 broad. It lies in a wild romantic region of hills, glens, rocky slopes, precipices, broken ground, and bogs. It contains isles, has bold shores, and is 40 feet above the sea.

CONNARA'CEÆ, a natural order of dicotyledonous or exogenous plants, consisting of trees and shrubs, sometimes climbing, with compound alternate leaves, destitute of stipules; the flowers in racemes or panicles. Resinous juices do not occur in this order. Forty or fifty species are known, all tropical. The best known product of this order is the beautiful wood called ZEBRA WOOD, the wood of a large tree which grows in Guiana, *Omphalobium Lamberti*. The fruit of some species of *Omphalobium* is eaten; the eatable part is the fleshy aril.

CONNAUGHT, the westmost and smallest of the four provinces of Ireland. It is bounded n. and w. by the Atlantic; e. by Ulster and Leinster, from the latter of which it is separated by the Shannon; and s. by Munster. It contains the counties of Galway, Leitrim, Mayo, Roscommon, and Sligo. Greatest length from n. to s., 105 miles; greatest breadth, not including Achil Island, 93 miles. Area, 6863 square miles. Along the west coast are many fine bays and harbors. The country, especially in the west, is mountainous and rugged, remarkably grand and picturesque. (For detailed information, see the respective counties). The people are still almost purely Celtic. In the times of the Irish pentarchy, the O'Connors were kings of Connaught. In 1590, the province was divided into six counties, the five above mentioned, with Clare (which was afterwards joined to Munster). It then lost its independence, and came under English administration. From famine and emigration, the population of C. have been diminished by more than one-third since 1841. It was in 1841, 1,420,705; in 1851, 1,012,479; in 1861, 919,135; and in 1871, only 846,213.

CONNE'CTICUT, the largest river to the east of the Hudson in the United States, rises on the south border of Lower Canada, near lat. 45° n., and after a fall of 1600 feet and a south-south-west course of at least 400 miles, enters Long Island Sound, in lat. 41° 16' n. With the exception of the state of Maine, it may be said to be the chief artery of the whole of New England, separating New Hampshire on the east from Vermont on the west, and afterwards crossing successively Massachusetts and the state of its own name. It is navigable up to Hartford, a distance of 50 miles, for a draught of eight feet; and up to Middletown, which is 16 miles nearer the sea, for a draught of ten feet; while, with a few subsidiary canals, it carries barges of eight or ten tons fully 200 miles above the former city. The C. has many alluvial intervals on its banks, which, being generally inundated in the spring, are remarkable for their fertility. The stream is famous both for the quantity and the quality of its shad; and its valley, about forty miles wide, presents a considerable variety of romantic scenery.

CONNECTICUT, the most south-westerly state of New England in the United States, and one of the original members of the great confederacy, is situated in lat. 41°—42° 3' n., and long. 71° 55'—73° 50' w. Area, 4750 square miles. Between 1790 and 1870, the inhabitants had increased from 238,151 to 537,454—being on the average an advance of barely 1¼ per cent. per annum. A result so anomalous, where the general population doubles itself in a quarter of a century, is creditably explained by the fact, that to all the new states of the Union C. has uniformly been a nursery of educated men of every class—of merchants and agriculturists, of lawyers and statesmen. According to the census of 1870, the state, besides its two senators in the upper house of Congress, sends four representatives to the lower, appointing, as the sum of both, six presidential electors. Under the existing constitution, which superseded the charter of Charles II. only in 1818, the local authorities are a governor, a lieutenant-governor, a senate of 18 to 24 members, an assembly of 237 representatives, and a supreme court. Between 1850 and 1870, the assessed value of taxable property, personal as well as real, appears to have risen from 119,088,672

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dollars to 425,483,237. Respectively to the west and east of Connecticut River are the Housatonic and the Thames, of which the former is navigable 12 miles upwards, and the latter 14. Many smaller streams afford valuable water-power. Besides the New Haven and Farmington Canal, 16 miles in length, C. is traversed in almost every direction by railways. The chief towns are Hartford, New Haven, Bridgeport, New London, and Norwich—the second and fourth being the principal ports, and all of them being accessible from the sea. The colleges are three in number; and the schools of every grade may stand a comparison with any in the Union. The soil is better fitted for pasturage than for tillage. The minerals are iron, plumbago, marble, and freestone. The staple productions are butter, cheese, wool, maize, oats, barley, wheat, flax, hemp, tobacco, and cider. There are 111 establishments for the manufacture of cotton goods, the products of which in 1870 amounted in value to 14,026,884 dollars, a total exceeded by only four other states in the Union.

CONNOISSEUR (Fr.), the French term by which we commonly designate persons who, without being themselves artists, are supposed to possess a discriminating knowledge of the merits of works of art. They are called by the Italians Cognoscenti. See DILETTANTI.

CO'NOID, a solid formed by the revolution of a conic section round its axis; such are the sphere, paraboloid, ellipsoid, and hyperboloid.

CO'NQUEST. In the law of succession in Scotland, heritable property acquired during the lifetime of the deceased, by purchase, donation, or excambion, is called C., in opposition to that to which he has succeeded, which is called Heritage. In the event of one dying intestate leaving only brothers, but brothers both older and younger than himself, or of his leaving uncles both older and younger than his father, or the issue of such brothers or uncles, these two kinds of property took different lines of succession, the heritage descending to the younger brothers or uncles, the C. ascending to the elder brothers or uncles. This was abolished in 1874. C., in a marriage-contract, merely means the difference between the possessions of the husband before and after marriage allowance being made for the increased expenditure; or that by which he has been made richer (locupletior). Such property is frequently settled either on the heir or on the issue of the marriage.

CO'NRAD. See KONRAD.

CONSA'LVI, Ercole, Cardinal, a distinguished reformer of abuses in the Papal States, was born at Rome, June 8, 1757. He was made cardinal and secretary of state by Pope Pius VII., and in this capacity concluded the concordat with Napoleon in 1801. His stanch maintenance of the rights of his own sovereign against the insidious encroachments of France offended Napoleon, who in 1806 demanded his removal from office; and the pope at last unwillingly consented, on the desire of C. himself, who was anxious that peace should continue. He was, however, again employed in 1815 in all the transactions between Rome and Paris, and also in settling the internal affairs of the Papal States. In the latter capacity, he reformed numerous abuses; and the measure known as the *Motu Proprio*, introduced by him in 1816, suppressed all monopolies, feudal taxes, and exclusive rights. He was a liberal patron of science, but especially of the fine arts, and employed his leisure in the study of literature and music. In diplomacy, he displayed great address, and was generally successful. He died in Rome, January 24, 1824.

CONSANGUI'NITY (Lat. *con*, together, and *sanguis* blood), the relationship which subsists between persons who are of the same blood. It is either *direct*—which is the relationship between ascendants and descendants—or *collateral*, between persons sprung from a common ancestor. In the direct line, a son is said to stand in the first degree to his father; a grandson, in the second degree to his grandfather; and so on. In the collateral or oblique line, two different modes of numbering the degrees of consanguinity have been in use, the one that of the civil, the other of the canon law. By the civil law, the degrees are separately numbered downwards to each party from the common ancestor, the common ancestor not being counted. Thus, brothers are in the second degree of consanguinity; uncle and nephew in the third; cousins-german in the fourth; and second cousins, or the children of cousins-german, in the sixth degree. By the canon law, consanguinity in the equal oblique line, i.e., where the parties are equally removed from the com-

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mon ancestor, is computed by the number of degrees between one of them only and the common ancestor; brothers being said to stand in the first, and cousins-german in the second, degree to each other. In the unequal oblique line, i.e., which the parties stand in different degrees of relationship to the common ancestor, the degree is determined by the number of steps between the common ancestor and the party further removed from him: thus, uncle and nephew are computed as in the second degree to each other, because the nephew, the further removed of the two, stands in the second degree to the common ancestor, his grandfather. The canon law computation is more generally used by English lawyers, though statute 22 and 23 Car. I. c. 10 adopts that of the civil law. Scotch lawyers, since the Reformation, have generally used the civil law mode of computation.

Affinity is the relationship brought about by marriage between a husband and the blood relations of his wife, or between a wife and the blood relations of her husband. The relations of one spouse in any particular degree of consanguinity stand in the same degree of affinity to the other spouse. There is no relationship by affinity between the blood relations of the husband and those of the wife.

Consanguinity and affinity have been at different times and in different parts of the world more or less looked on as impediments to marriage between the parties related. Among the ancient Persians and Egyptians marriages are said to have been sometimes sanctioned between brother and sister, and even father and daughter. The Athenians, while permitting marriages between brothers and sisters uterine, prohibited them between the same relations by the father's side or the full blood. In the book of Genesis, we read of Abraham marrying his half-sister. The Levitical law prohibited marriage between relations in the direct line, between brother and sister, nephew and aunt, and apparently by implication, uncle and niece. A son was prohibited from marrying his father's wife.

The Roman law prohibited marriage between ascendants and descendants, a prohibition extended to relations by adoption, and even after the dissolution of that tie. In the collateral line the prohibited degrees included brother and sister (extending to persons so related by adoption where the tie continued to exist), and all cases where one party stood *in loco parentis* to the other, as uncle and niece. Marriage between cousins-german, at one time prohibited, was declared lawful by Arcadius and Honorius. The degrees prohibited in consanguinity were by Constantine also prohibited in affinity.

By the old canon law and early decretals, marriages were prohibited between persons as far removed as the seventh degree of consanguinity or affinity—i.e., between persons who might, by the civil law computation, be within the twelfth degree to one another. The fourth council of Lateran, 1215 A.D., narrowed the prohibition from the seventh to the fourth degree; i.e., the grandchildren of cousins-German. Affinity was held to be constituted not merely by marriage, but by the spiritual relationship of standing sponsor at baptism, and by illicit intercourse; marriage being prohibited between persons one of whom had carnal connection with a relation in the fourth degree of the other. A marriage between persons related in any of these ways was accounted incestuous, and the children bastards. The pope assumed the right of granting dispensations from impediments to marriage arising from consanguinity and affinity, a power which seems to have been first exercised in the 12th century. In no instances have dispensations been granted to relations in the direct line, but one or two dispensations are said to have been granted between brother and sister; and between uncle and niece, they are still occasionally granted in countries where the canon law continues to be binding. Between remoter relations, they have been common. The extent to which these prohibitions were carried, and the possibility of their being dispensed with, naturally tended to encourage profligacy and lax ideas of the marriage tie, it being hardly possible to say of any marriage that it might not one day be proved invalid. The Council of Trent restricted the impediment of affinity from illicit intercourse to the second degree.

In the countries which embraced the Reformation, a general relaxation took place in the prohibitions to marriage from consanguinity and affinity. In England, 32 Hen. VIII. c. 38 allowed all persons to marry who were not prohibited by the Levitical law; and according to the interpretation put on this statute, the prohibitions included all relations in the direct line, brother and sister, and collaterals,

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when one party is brother or sister to the direct ascendant or descendant of the other; the degrees prohibited in consanguinity being equally prohibited in affinity. The prohibitions from consanguinity have been held to extend to bastard relations. But down to 1835, marriages within the prohibited degrees were valid and the issue legitimate, unless the marriage had been annulled by a declaratory sentence of the Ecclesiastical Court, which could only be obtained while both spouses were alive. By act 5 and 6 Will IV. c. 54, all marriages within the prohibited degrees of consanguinity and affinity were made absolutely void.

In Scotland, for a very short time after the Reformation, the papal power of dispensation was exercised by the crown. Acts 1567, c. 14, and 1567, c. 15, professing to take the Levitical law as the standard, assimilated the prohibitions from consanguinity and affinity to those of England. Incest, or sexual intercourse with persons within the prohibited degrees, was, by the former statute, made a capital crime. As to marriages between bastard relations, the law of Scotland is in a doubtful state; but there is no prohibition against marriage with a relation however near of a person with whom one has had sexual intercourse.

In France, the Code Napoléon prohibits marriage between ascendants and descendants lawful or natural, and persons similarly connected by affinity; and in the collateral line between brothers and sisters lawful or natural, and persons similarly connected by affinity. Marriage between uncle and niece, and aunt and nephew, is also prohibited. In Spain and Portugal, the canon-law restrictions are in full force, with the corresponding system of permissive dispensations. In various countries of Europe, as Denmark, no prohibitions from affinity, except in the direct line, are recognised. In most of the United States of America, marriage is allowed between uncle and niece.

The different methods in which the degrees of C. and affinity are computed in England and Scotland are explained under MARRIAGE, SUCCESSION, HEIR, &c.

CO'NSCIENCE. See ETHICS.

CONSCIENCE, Courts of, in England. These were courts for the recovery of small debts, constituted by special local acts of parliament in London, Westminster, and other trading districts. These courts were also called *Courts of Requests*. On the establishment of county courts, the courts of C., with a few exceptions, were abolished. See COUNTY COURTS.

CONSCIENCE, Hendrick, the most fertile and original writer of fiction in Belgium, was born December 3, 1812, at Antwerp, where his father was inspector of the dockyards, until he became a dealer in waste-paper, old books, &c. C. educated himself by the aid of his father's miscellaneous store of books until his 15th year, when he entered a school, where he was engaged to assist the master in teaching. On the breaking out of the revolution in 1830 C. joined the ranks under General Niellon, and served till 1834, when he left the service, being disgusted with the stricter discipline that was being introduced. Having failed in all his attempts to obtain employment, he tried his hand at writing, and composed in Flemish the novel, "In het Wonderjaer" 1566 (Ghent, 1837) which, notwithstading its unprecedented success, left him in debt with his printer. His father refused to do anything for him until he took up some regular employment; and he was thus driven from home in an almost penniless state. At this time, the painter Wappers interested himself for him, and procured him some slight assistance from the king. C. now wrote his "Phantasia," a collection of fantastic tales, and his celebrated historical novel, "De Leeuw van Vlanderen" (Antw. 1838); but being dissatisfied with the small pay and irksome work of the post he had obtained in a government office, he threw up all his avocations, and for a year worked as a gardener. Wappers again befriended him, by inducing the king to give him the place of Registrar at the Royal Academy of Painting at Antwerp. In 1845, he obtained the honorary title of Agrégé of the university of Ghent, and was appointed to instruct the royal children in Flemish. C. has written numerous tales and novels, most of which have been translated into French and German, and some into English—as, for instance his "Sketches of Flemish Life," of which several English translations have been made; "Demon of old," "Lion of Flanders," &c. C. has written two historical novels, "Geschiedenis van Graef Hugo van Craenhove" (1845), and "Jakob van Artevelde" (1849), which are esteemed among his best; but his *forte* lies rather in the delineation of simple vil-

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lage life. His "Illustrated History of Belgium" (1845) is interesting as a national work, but of little value as an authority. In 1870 he published "Bavo en Lieveken;" in 1871, "De Kerels van Vlanderen" (1871); in 1874, "De Keuzvdes Harten" and "Eene Verwarde Zaak;" in 1875, "Schandevrees;" in 1876, "Gerechtigheid van Hertog Karel." C. has contributed largely to the revival of Flemish literature.

CONSCIOUSNESS. This is perhaps the most comprehensive term employed in designating the mind. If it had been used only in its widest signification, there would have been little difficulty in defining it; but unfortunately there are some exceedingly important meanings of a narrower range that are commonly expressed by it, rendering it an ambiguous or equivocal term, and like all such terms, a source of fallacy and misapprehension.

In the widest meaning, C. is almost identical with mind in action. When we are mentally alive, or performing any of the recognised functions of the mind, we are said to be conscious; while the total cessation of every mental energy is described by the term "unconsciousness," among other phrases. In dreamless sleep, in stupor, fainting, and under the influence of the anæsthetic drugs, we are unconscious; in waking, or rallying into renewed mental activity, we are said to become conscious.

As the mind in its waking or active condition may be more or less excited, or vary in the intensity of its manifestations, there are degrees of C.; and, in accordance with a very common usage, the name is apt to be applied to denote the higher degrees in opposition to the lower.

In first learning to write, to cast up sums, or to play on an instrument, our mind is put very much on the stretch; in other words, we are very much excited or highly conscious. When years of incessant practice have consummated the process into a full-formed habit, a very small amount of mental attention is involved; and we may then be said to perform the work all but unconsciously.

We must next advert to the special or restricted meanings of the term, which are those that play the most important part in philosophical discussion. In the first place, we find it applied to denote the mind's cognisance of itself, as opposed to the cognisance or examination of the outer world. Hence, in studying our own minds, we are said to be using C. as the instrument; but in studying minerals or plants, we resort to external observation by the senses. A contrast is thus instituted between C. and observation, which contrast gives to the former word a peculiarly contracted meaning; for in the wide sense above described, observation is truly an act of consciousness.

In the next place, C. is sometimes identified with Belief. We often express a strong affirmation by saying, that we are quite conscious that such a thing is so. It is the strong instinctive tendency of our nature to believe a number of things before we have gone through any large experience of matter of fact. The believing function is a prominent attribute of mental activity. We are scarcely able to feel or act without the operation of belief, or without making assumptions in anticipation of the reality. We believe first, and prove or disprove afterwards. The more intensely we are made conscious, the more strongly we pass into these intuitive convictions. We unhesitatingly believe in the future persistence and universal prevalence of the order of things that we are born into, until such time as our experience gives us a check. Our emotions all produce beliefs in proportion to their strength. Fear makes us believe in coming evil; joy and elation give confidence in coming good. So that it is true to a certain extent, that the state of belief is engendered along with C., and is stronger as that is stronger; but it does not follow, as is frequently maintained, that to be conscious of every affirmation is to verify it, because our C. cannot be presumed to lie. See COMMON SENSE.

Correct usage, therefore, would dictate the employment of the term in question only in the one sense, in which it is co-extensive with being mentally alive, as opposed to sleep, torpor, insensibility, &c. Anything that renders the mental activity more intense, that increases the whirl of the brain (such as strong pleasures and pains, great interest in anything that is going on, &c.) is designated by the positive term C.; the opposite condition, and also the feebler modes of excitement, are expressed by the negative—unconsciousness. All mere special and restricted applications should be forborne, as introducing confusion into thought, and error into

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philosophy. The study of our own mind may be expressed by such phrases as "self-consciousness," "introspective attention," and the like. As it is an entire fallacy to talk of C. in general as accrediting doctrines or matters of belief, any acceptation of the word implying this should be avoided.

Points of great importance are involved in the determination of the *conditions* of C., or the circumstances attendant on the manifestation of mental excitement; in other words, the stimulants of our emotional and intellectual wakefulness. The most general and fundamental condition of our becoming conscious, as regards influences external to the mind, is *change*. The even continuance of one impression tends to unconsciousness; and there are a number of facts that shew that if an influence were present in one unvarying degree from the first moment of life to the last, that influence would be to our feeling and knowledge as if it did not exist at all. This important point is more fully illustrated under CONDITIONED.

In a work, entitled "Contributions to Mental Philosophy," by Immanuel Hermann Fichte—the son of the renowned Johann Gottlieb Fichte—translated by Mr. Morell (Longmans, 1859), the attempt is made to establish the existence of a Preconscious Mind, distinct from our conscious life, and not dependent like that upon the bodily organisation.

It appears that Fichte considers the power of germination and growth—or that energy, whatever it is, that unfolds the germ and conducts it to a completely formed organisation—as a function of the mind or soul; which is almost to revert to the views of the ancient philosophers, with whom the soul was the "vital principle," or the peculiarity that distinguished organised beings from minerals. Aristotle spoke of the soul of plants as well as of animals, or of man. Fichte couples this power of germination with the following things—namely, the instincts; the processes of intelligence that we seem to go through without being aware of the steps, as in the sudden inspirations of men of genius; with all the mysterious phenomena of second-sight, clairvoyance, &c.; and the aggregate of this he erects into a preconscious mind or soul, the contrast of C. as above defined. For the varieties or divisions of our conscious states, see MIND.

CONSCIOUSNESS, Double. See DOUBLE CONSCIOUSNESS.

CONSCRI'PTION is the system whereby the French—since the year 1795—and some other foreign armies are recruited. It differs essentially from the English system in being compulsory, and, taken for all in all, as a disturbance of the system of employment in all grades of society, is probably the most expensive means of recruitment yet devised (see BRITISH ARMY). Every Frenchman may be called to enter the army at the age of 20; but those who choose to enlist, as early as 18. He cannot again be called upon to serve. The term is for 5 years in the regular army, 4 in the army reserve, 5 years in the territorial army (militia) and 6 in the territorial reserve. This brings the conscript to 40 years of age, when his liability to service ceases. The law of 1872, reorganising the French army, forbids the providing of substitutes by conscripts. An account is kept of the number of youths in France who reach the age of 20 in each year (about 280,000). All those are exempt from conscription who are under 5 feet 2 inches in height; or have any natural infirmities unfitting them for active service; or are the eldest of a family of orphans; or are the only sons of widows, or of disabled fathers, or of fathers above 70 years of age; or are intended for the church; or are pupils at certain colleges. Moreover, if two brothers be drawn as conscripts, and the younger is efficient, the elder is declared exempt; and if of two only brothers one is already in the army, or has retired through wounds or infirmity, the other is exempt. Culprits and felons are not allowed to enlist. The law of 1872 making military service obligatory on all Frenchmen (save in the above cases) has assimilated the French army system to that enforced in Prussia since 1813.

CONSECRA'TION is the act of solemnly dedicating a person or thing to the service of God. It was one of the most widely spread religious ceremonies of the ancient world, being practised in India, Egypt, Chaldæa, Judæa, Greece, Rome, Britain, and other countries. In the Old Testament, we read of the C. or dedication of the first-born, both men and beast, to the Lord; also the dedication of the Levites, of the tabernacle and altar, of fields, houses, walls, &c. This custom, at least so far as regarded places and things, did not pass immediately from Judaism

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to Christianity, for the latter being more or less a persecuted religion until the time of Constantine, could not venture to indulge with safety in any public ceremonialism; but no sooner was the sword of persecution sheathed than, according to Eusebius, "the sight was afforded us, so eagerly desired and prayed for by all—the festivals of dedications and consecrations of the newly erected houses of prayer throughout the cities." Eusebius himself describes the C. of the church built at Jerusalem by Constantine, 335 A. D. The practice of consecrating religious edifices has continued to the present day in the Roman and Anglican churches. The forms were at first very simple, consisting chiefly of prayer, the celebration of the Lord's Supper, thanksgiving, and benediction; but they afterwards became more numerous and imposing, whilst, also, the bishops and higher dignitaries assumed the power of consecrating entirely to themselves. An important part of the C. of Roman Catholic churches consists in the deposition of relics for a time upon the altar. In the English Church, each bishop is left to his own discretion as to the form of C. to be adopted, but that most generally used is the form sent down by the bishops to the lower houses of convocation in 1712. The English Church also retains the C. of burying-grounds.

C. OF ARCHBISHOPS AND BISHOPS. According to a canon of the first Nicene Council, there must be four, or at least three bishops present at the C. of an archbishop or bishop. The form used in the Church of England is that prepared in the reign of Edward VI. The Romanists deny the validity of English orders generally, as derived from heretical and improperly consecrated bishops. They had an old story, refuted by their own historian Lingard, which is known as that of the "Nag's Head Consecration." According to this story, Archbishop Parker was consecrated at the Nag's Head Tavern, Cheapside, by one of the Protestant bishops present laying a Bible on his head, and saying; "Take thou authority," &c. Lingard thus relates the facts: "Barlow, the deprived Bishop of Bath, and Hodgkins, once Suffragan of Bedford, who had both been consecrated according to the Roman Catholic pontifical, in the reign of Henry VIII., and Scorey, the deprived Bishop of Chichester, and Coverdale, the deprived Bishop of Exeter, who had been both consecrated according to the Reformed ordinal, proceeded to confirm the election of Parker, and then to consecrate him after the form adopted in the reign of Edward VI. A few days later, Parker, as archbishop, confirmed the election of Barlow to the see of Chichester, and of Scorey to that of Hereford, and with these for his assistants, consecrated all the other prelates elect." The C. took place in the chapel at Lambeth, as appears by the archbishop's register, and Lingard says that there is nothing to countenance the supposition of the entry being other than authentic. The story probably arose from a fact, mentioned by Fuller, that the commissioners who confirmed Parker's election dined at the Nag's Head, a tavern much frequented by the country clergy.

CONSECRATION OF THE ELEMENTS. See LORD'S SUPPER.

CONSE'OUTIVE, a term in Music applied to octaves and fifths which, according to the rules of harmony, are strictly forbidden.

CONSEGUIANA, a volcano of Nicaragua, occupies a promontory on the south side of Fonseca Gulf, about ten miles distant from the Pacific Ocean. The crater, at an elevation of about 4000 feet above the mean level of the surrounding country, is about half a mile across, while its interior descends perpendicularly to a depth of 200 feet. In 1835 a fearful eruption, the last on record, converted into a waste a large tract of grazing land.

CONSE'NT. When we state that C. is the foundation of all contracts and legal obligations of every kind, we state a proposition often in the mouths of lawyers, but the vast magnitude and importance of which is by no means always apparent even to them. The doctrine that the free C. of the parties bound, and not the will of any earthly legislator, or the form in which that will is expressed, constitutes the binding element in contracts, flows as an inevitable logical consequence from the doctrines of personal and political freedom. And yet we continually forget it, and not only speak but act at variance with it. We talk of persons being married by the priest, and divorced by the proctor, whereas it is obvious that a valid marriage, like every other contract, can be made and unmade only by the contracting par-

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ties; and that all that either civil or ecclesiastical authority can do, is to ascertain, at the instance of one or other of them, whether it *has* been made or unmade. From overlooking this point of view, differences between legal systems, which are merely external, are often supposed to be fundamental. The law of Scotland, which admits several ways of proving matrimonial C. which the law of England rejects, is on this account supposed to differ from it *in principle*. The only question between them, in reality, is, as to whether the circumstances which the law of Scotland admits in proof of the existence of C. do or do not prove it in point of fact. If it be true that the only means by which it can be ascertained that two persons do agree to be man and wife, is by their declaring their agreement either before a clergyman or before a parliamentary registrar, then the law of England does right in rejecting all other evidence. If, on the contrary, the fact can be established, as is believed in Scotland, by other means, such as a declaration before witnesses, or an exchange of writings, then the law of Scotland is right in admitting these means of proving it, and making the question of marriage or no-marriage, as it does, one of simple proof. The difference between the two systems is thus seen to be not one of principle, but one of expediency—a question, not in the law of marriage, or of contracts, which is the same in both countries, and in every country, but in the law of evidence.

Yet so strangely illogical are mankind, that in Scotland it is still asked whether or not a marriage can be constituted, in certain circumstances, without a declarator of the Court of Session; and in England, until very recently, no marriage could be dissolved without an act of parliament. The practical question as to how C. shall be proved, is one surrounded at all times with the greatest difficulty. That its absence may be assumed in the case of all persons of imperfect understanding, and, consequently, that the power of contracting should be denied to idiots, madmen, and pupils, helps us but a very small way. The real difficulty consists in distinguishing, in the case of grown and sane men, between such *real* C. as may be safely assumed to be a deliberate act of the reason, taking that word in its widest sense, and such *apparent* C. as may have had its motive in caprice, passion, ignorance, or any temporary and accidental aberration of mind.

CONSERVA'TION OF FORCE. See FORCE.

CONSE'RVATIVE. See WHIG AND TORY.

CONSERVATOIRE, or Conservato'rium (Ital. *conservatorio*) a name given by the Italians to schools instituted for the purpose of advancing the study of music and maintaining its purity. In the earliest times, these schools were partly attached to benevolent institutions and hospitals; others, again, were supported by opulent private individuals. They were originally intended for foundlings, orphans, and the children of poor parents. Some trace their origin to St Ambrose, Bishop of Milan, in the 4th c., or St Leo, who flourished in the 5th. The scholars, male and female, all received free board, lodging, clothing, and were taught to sing and play. Extra boarders were also admitted on paying a fee. In Naples, there were at one time three such schools, while in Venice there were four, expressly for females. In 1818, the Neapolitan conservatoires were reduced to one, under the name of Real Collegio di Musica. The Venetian conservatoires shared in the downfall of the Venetian republic. A new grand C. was founded at Milan in 1808, which still exists. In France, the necessity of a school for educating singers gave rise to the *Ecole Royale de Chant et de Déclamation*, in 1784. During the French Revolution, in consequence of the scarcity of instrumental musicians for the army, the government decreed the erection of an Institut National de Musique, in 1793, which was changed into the present establishment in 1795 under the name of the C. de Musique. The yearly expenses of this C. were fixed at 240,000 francs, the number of masters was 115, and the pupils of both sexes amounted to 600. In 1802, the expense was reduced to 140,000 francs, with a corresponding reduction in the number of masters and pupils. The course of study is divided over 66 different classes, in which all appertaining to music and also declamation is taught by the best masters. The elementary works published by this C. for all instruments are known over the whole world. Next to the conservatoires of Italy and France come those of Warsaw, Prague, Brussels, and Vienna, which last was established in 1816. In 1842, a C. was established in Leipsic, under the auspices of Mendelssohn, which is reckoned the

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most important in Germany at the present day. There are also conservatoires in Cologne, Munich, Stuttgart, Berlin, &c.

CONSERVA'TOR OF THE STAPLE. See CAMPVERE.

CONSERVATORS OF THE PEACE. The sovereign, by virtue of his office, is the principal conservator of the peace within these realms. The function which he thus possesses he may delegate, thus constituting a subject a conservator of the peace. The office, however, must always be exercised in the sovereign's name, and it is for this reason that we always speak of the king's or of the queen's peace. Several high officers of the crown, the Chancellor or keeper, the Lord High Steward, the Lord Marshal, and the Lord High Constable, when there are such offices, all the justices of the Queen's Bench, the Master of the Rolls, are C. of the P. throughout the whole kingdom, and may commit breakers of the peace or bind them in cognizances anywhere. Other judges possess this power only within the limits of their own jurisdiction. The sheriff and coroner are C. of the P. within their respective counties, and constables, tithing-men, &c., within their jurisdictions. But in addition to these official conservators, others were appointed expressly for the purpose, previous to to the appointment of justices of the peace, in the reign of Edward III. Their powers were far inferior to those of the justices, being confined exclusively to the function which the name indicates. The lords of manors frequently possessed the powers of conservators within their manors by prescription, and it was not unusual for lands to be held on the tenure of discharging the duties of a conservator of the peace within the county. Lastly, conservators were appointed by letters-patent from the crown in cases of emergency for the preservation of the peace in particular districts. All these different kinds of conservators, with the exception of these judges and others who are conservators *ex officio*, were superseded by the appointment of Justices of the Peace (q. v.).

CONSE'RVATORY, in Horticulture, a house for the cultivation of tender exotic plants, which, although requiring protection from frosts, and a little assistance of artificial heat, do not need the heat of the hothouse or stove. The only distinction between a C. and a green-house is, that in the former the plants grow in borders of earth; in the latter, they are in pots, and these two characters are often combined. The structure, management, &c., are much the same for the C. as for the green-house; but in the warmer parts of the country, the roof and even the sides are with advantage made capable of being removed in summer. In all situations the most free and frequent ventilation is requisite. A C. is often attached to a mansion, so as to communicate directly with one or more of the apartments, instead of being placed in the garden.

CO'NSERVES are described by Cooley in his "Cyclopædia of Practical Receipts," to be "recent vegetable matter, as flowers, herbs roots, fruit, and seed, beaten with powdered sugar to the consistence of a stiff paste, so as to preserve them as nearly as possible in their natural freshness." C. are made by druggists as vehicles for more active medicines, and by confectioners as sweetmeats.

CONSIDÉRANT, Victor-Prosper, a French Socialist, was born in 1805 at Salins, in the department of Jura. After being educated at the Polytechnic School of Paris, he entered the army, which, however, he soon left to promulgate the doctrines of Fourier (q. v.). After the death of his master, C. became the head of the Societarians, and undertook the management of "The Phalanx," a review devoted to the maintenance and spread of their opinions. Having gained the support of a young Englishman, Mr Young, who advanced the required sum of money, C. established, 1832, on a large estate in the department Eure et Loire, a Socialist colony or *Phalanstère;* but the experiment failed, and with it "The Phalanx" fell to the ground. However, a new organ of co-operative doctrine, the "Démocratie Pacifique," was soon established, and was edited by C., who displayed great zeal perseverance, and ability, in his hopeless battle with the laws of society as now constituted. Among his numerous writings, the chief is the "Destinée Sociale," dedicated to Louis Philippe. In 1849, C. was accused of high treason, and compelled to escape into Belgium, whence he emigrated to Texas, returned to Brussels, and again went to Texas, where he founded a Societarian community, *La Réunion*, which flourished for a time, but has since come to nothing. C. returned to France in 1869. See COMMUNISM.

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CONSIDERATION, in Law, the thing given, or done, or the forbearing or suffering something as recompense to another, for doing, giving, forbearing, or suffering. An obligation incurred without C. is, in England, termed voluntary, in Scotland gratuitous; if for C., it is so styled in England, but in Scotland it is called onerous. Considerations are divided in England into good and valuable, the former being affection for a near relative, the latter a pecuniary or other tangible benefit, or marriage. There is no corresponding division in Scotland. But in Scotland, on the other hand, there is, as a general rule, no need for the intervention of a C. to make a contract valid, while in England a contract without C. is invalid, unless it be evidenced by formal deed (q. v.). In this respect, the law of England is founded upon the maxim of the civil law, *ex nudo pacto non oritur actio*; while the Scottish rule is founded on that of the canon law, *omne verbum de ore fideli cadit in debitum*. But the C. which in England is sufficient to support a contract, may be of the most illusory kind. Thus, an agreement to take less than the full sum in payment of a debt is without C. and invalid, even though the sum stipulated be paid, because there is no C. to support the agreement to give up the residue; but if the agreement was to take a stick of sealing-wax instead of the money, it is an agreement for valuable C. and binding, and the transfer of the wax extinguishes the debt.

There are some circumstances which, in both countries, warrant the setting aside of obligations without C., whether made by deed or not. In England, they are void as against *bona fide* purchasers, by 27 Eliz. c. 4; and void as against creditors where the grantor is indebted to such creditors at the time to the extent of insolvency, by 13 Eliz. c. 5. A similar rule to the latter is established in Scotland by the act 1696, c. 5, and without proof of insolvency when the deed is granted to a near relation, or a person in a confidential situation, by 1621 c. 18. And all obligations for which the C. is illegal or immoral, are in both countries void.

CONSIGNMENT, in Mercantile Law, is the term applied to goods which are placed in the hands of an agent or factor, for sale, or for some other specified purpose. Where either the consignor or consignee becomes bankrupt, questions of nicety often arise regarding ownership, and the consequent rights of the parties and their creditors.

CONSISTORY (Lat. *consistorium*), properly, a place of assembly, but in the later Latinity the word came to signify the particular place where the privy-council or cabinet of the Roman emperor met, and after the time of Diocletian and Constantine, the council itself. The assessors of this council were partly the ordinary members (*comites consistoriani*), such as the imperial chancellor and seneschal, partly extraordinary; and their duty was to deliberate on all the important affairs of legislation, administration, and justice. The *form* of the imperial C. passed over into the early Christian Church. The bishops established their consistories; and the highest ecclesiastical court, composed only of cardinals (the College of Cardinals), which meets in the Vatican, under the presidency of the pope, to determine all such matters as the appointment of cardinals, archbishops, bishops, &c., still bears this name, as do also the private councils which the pope can call at his pleasure. The Protestant Church of Germany was induced to perpetuate the consistorial courts principally because the episcopal authority passed into the hands of territorial princes (Ger. *Landesfürsten*) not familiar with ecclesiastical affairs. The first Lutheran C. was established at Wittenberg in 1542. After 1555, when the peace of Augsburg secured the recognition of the Protestant religion, similar consistories were gradually formed in other places. The Lutheran consistories exercise a supervision and discipline over religion and education, over the clergy and the schoolmasters, and examine the theological candidates on their trials for license and ordination. They have the regulation of divine worship, the administration of church property, and at an earlier period, possessed a certain jurisdiction in regard to marriage.—In the French Protestant churches, the C. possesses a more restricted jurisdiction than in Germany. It exercises authority over a *circonscription*, i. e., a division of the church containing 6000 souls, and is composed of all the pastors of the *circonscription*, together with from 6 to 12 lay-elders elected by a certain number of the people. In that portion of the French Protestant Church which has adopted the Augsburg Confession, the authority of the French monarch is more recognised than in the Reformed Church, for it has a *consistoire général*, composed of delegates, lay and clerical, of the

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various *circumscriptions*, the president of which is a layman nominated by the emperor.—In England, the word is used to denote the court Christian or spiritual court. Every archbishop and bishop has a consistorial court, held either in his cathedral or other convenient place, before his chancellor or commissary, for ecclesiastical causes. In Scotland, the consistorial courts have lapsed into the commissary-courts. See COMMISSARY.

CONSOLA'TO DEL MA'RE. See MERCANTILE LAW.

CO'NSOLE (Fr.), in Architecture, a projection resembling a bracket, frequently in the form of the letter S, used to support cornices, or for placing busts, vases, or figures on. Consoles were often richly ornamented in the under part. See BRACKET, CANTALIVER.

CONSOLIDA'TION ACTS. In order to secure uniformity in acts of parliament having reference to public undertakings, and to avoid the necessity of repeating, in each special act, the clauses usually introduced into such acts, the device has been adopted of consolidating or combining all these provisions in one act having reference to the particular kind of undertaking. Of general acts of this nature the most important are, the Companies' Clauses Consolidation Act, 1845 (8 and 9 Vict. c. 16); The Lands' Clauses Consolidation Act, 1845 (8 and 9 Vict. c. 18), amended as to Ireland (14 and 15 Vict. c. 70); and the Railways' Clauses Consolidation Act, 1845 (8 and 9 Vict. c. 20).

CO'NSOLS, a contraction of Consolidated annuities. In incurring the national debt, government borrowed money at different periods on special conditions, being generally the payment of an annuity of so much per cent. on the sum borrowed. Great confusion arose from the variety of stocks thus created, and it was thought expedient to strike an average of their value, and consolidate them into one fund, kept in one account at the Bank of England. The Consolidated Annuities' Act was passed in 1757.

CO'NSONANCE, in Music a term applied to combinations of sounds, whose vibrations when heard together so satisfy the ear that no other sound is wished for, or expected to follow. The more or less satisfying effect of C. depends on the greater or less simplicity of the interval formed by the combined sounds. Intervals whose relative vibrations can be expressed by numbers from 1 to 6, are considered consonant; while those which can only be expressed by the higher numbers, not a duplication of the lower, as 7, 9, 11, 13, &c., are called dissonant. Sounds vibrating as 1 : 1, are unison; as 1 : 2, produce the octave; as 2 : 3, the fifth, which inverted becomes 3 : 4, the fourth; as 4 : 5, the major third, which inverted becomes 5 : 8, the minor sixth; and 5 : 6, the minor third, which inverted becomes 6 : 10, or 3 : 5, the major sixth. Consonant intervals are therefore the third, fourth, fifth, sixth, and octave; from which it follows that there is only one consonant fundamental chord in music, viz., the common chord, or *trias harmonica perfecta*, being a bass note with its third, fifth, and octave, which inverted produces the chords of the 6th and the $\frac{4}{4}$. See CHORD. The ancient Greeks admitted of still fewer consonances in their system of music, as they treated the third and sixth as dissonances; a proof that their system of harmony was not the same as ours. Their name for C. was Symphony, and for dissonance, Diaphony. Early in the middle ages, only the octave, fifth, and third were treated as consonances. Franco of Cologne was the first who divided C. into perfect, semi-perfect, and imperfect. In the writings of Marchettus, and of Joannes de Muris, in the first half of the 14 c., we find already the important rule, that two perfect consonances following in similar progression are not allowable. The study of the C. was carried still further in the 16th c. by Zerlino, who ascertained the true mathematical proportions of the major and minor thirds. Notwithstanding this, Palestrina, up to the end of the same century, and long after him, all who wrote in the same style, carefully avoided the use of the third in the final chord, finishing always with the perfect consonances according to Franco. Of late years the importance of the C. has attracted the attention of many eminent theorists in music, as well as philosophical writers of undoubted judgment, some of whom do not hesitate to consider the interval of the seventh a C., because it differs from other dissonances in not requiring preparation. There cannot be a doubt that the chord of the seventh, C, E, G, and B flat, considered individually and not in connection with other chords, is as euphonious and satisfying as the common chord; and when these intervals are placed at the dis-

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tance from the fundamental note they harmonically arise at, the consonant nature of the combination is still more obvious. A scientific organ builder in Scotland has long been in the practice of introducing the seventh as an interval in his mixture stops, forming with the fundamental stops a union of sound decidedly consonant, and producing a remarkably brilliant effect. The exact limit of C., or the point where dissonance begins, seems not definitely fixed, if fixed it can be. To define C. to be agreeable sounds, and dissonance to be the reverse, as some do, is clearly absurd, because they both essentially belong to harmony or concord, or as the Germans more properly call it, *Die Kunst des Wohlklangs*, in which there can be nothing absolutely discordant.

A perfect C. causes a musical effect known as Tartini's Grave Harmonic, it having been first observed by the eminent violinist of that name. Along with any two musical notes sounded continuously, there may be heard (if the notes are in accord) a third deeper tone, caused by that number of vibrations which is the greatest common measure of the numbers producing the primary notes, and upon this Tartini founded his theory of harmony (now obsolete), by assuming that the grave note is the natural base of the chord producing it. The note thus sounded may be too deep to be appreciated by the uneducated ear, although felt as a succession of beats, and these should not be confounded with the "beats" resulting from the sound of a discordant interval, a species of jar or flutter known to tuners as the consequence of the *imperfection* of a consonance. The subject is treated at length by Professor de Morgan in a paper published in the Transactions of the Cambridge Philosophical Society, 1858.

CO'NSONANT. See LETTERS.

CO'NSORT, literally, one who throws in his lot with another. In English, constitutional law, the term is applied to the husband or wife of the reigning sovereign, viewed not in a private but a public capacity, as participating to a certain limited extent in the prerogatives of sovereignty. The extent of these prerogatives in the case of a queen-C. are stated by Blackstone. She is, he says, a public person, exempt and distinct from the king, and "not, like other married women, so closely connected, as to have lost all legal or separate existence so long as the marriage continues." For this, Sir Edward Coke gives the curious reason, that "the wisdom of the common law would not have the king (whose continual care and study is for the public, and *circa arduua regni*) to be troubled and disquieted on account of his wife's domestic affairs." In addition to this peculiarity in her domestic position, the queen-C. enjoys several exemptions and minute prerogatives. She pays no toll, and is not liable to amercement in any court. But where no such exemption is expressly recognised by law in favor of the royal C., she is on a footing of equality with other subjects, and the privileges which the title conveys are chiefly those of precedence, and belong to court etiquette. Up to the year 1857, the husband of Queen Victoria possessed no distinctive English title, and no place in court ceremonial except such as was conceded to him by courtesy. In that year, the title of Prince-C. was conferred upon him by letters-patent.

CONSPI'RACY, a combination between two or more persons to perpetrate an unlawful act. See COMBINATION.

CONSPIRACY BILL. In consequence of an attempt to assassinate the Emperor and Empress of the French whilst going to the opera on the evening of the 14th of January, 1858, by the Italian refugee Orsini and others, by means of explosive shells partly manufactured in England, a bill was introduced into parliament by Lord Palmerston, declaring conspiracy to murder, which the law of England had hitherto treated as a misdemeanor, to be a felony, punishable with penal servitude, and applying that provision to all persons whether English or foreign, and to all conspiracies to murder wherever intended. In place of being regarded merely as a piece of law reform, the C. B. obtained a political character, partly from a dispatch from the French minister, Count Walewski, demanding some such change in our law, and partly from expressions contained in certain addresses which were presented to the Emperor by the French army, and published in the government organ, the "Moniteur," which were regarded as insulting to England. The ministry were accused of truckling to France; and though on the motion for leave to bring in the bill they had a majority of 200 (299 against 99), an amendment by Mr

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M. Gibson on the second reading, virtually amounting to a vote of censure, was carried by a majority of 19 against them (234 to 215).

CO'NSTABLE (Lat. *constabulus*). Whether this officer was called originally *comes stabuli*, the count of the stable or master of the horse (as alleged by Ducange), or the *koning-stapel*, staff and stay of the king (as Coke, Selden, and others with, less reason, have maintained), the C., both in France and England, was a military personage of the very highest rank. The C. of France rose gradually in importance from the comparatively modest position of an officer of the household, till at last he became *ex officio*, the commander-in-chief of the army in the absence of the monarch, the highest judge in military offences and in all questions of chivalry and honor, and the supreme regulator and arbitrator in all matters connected with tilts, tournaments, and all martial displays. The office of C. is traced back by Anselme to Alberic, who held it in 1060; but the first C. of France who appeared at the head of an army was Matthew, the second Seigneur de Montmorency. The office was suppressed by Louis XIII. in 1626. Among the offices of the ancient monarchy which were restored by Napoleon for mere purposes of state, that of C. was one. His brother, Prince Louis Napoleon, afterwards king of Holland, was created Grand C., the Vice-C. being Marshal Berthier. The office was again abolished on the restoration of the Bourbons, and has not since been re-established. But besides the C. of France, almost all the great vassals of the crown had constables who filled analogous offices at their minor courts. There were constables of Burgundy, of Champagne, and of Normandy; the latter of whom may be regarded as the progenitor of the C. of England.

Shortly after the Conquest, a Lord High C. of England appears, with powers and privileges closely corresponding to those of the C. of France (18 Rich. II. st. 1 c. 2). His position as judge of the court of chivalry, in conjunction with the Earl Marshal, and the limitation of his power, which followed on the statute 18 Rich. II. c. 2, are explained under Chivalry, Court of. The office was abolished by Henry VIII. on the attainder of Edward Stafford, Duke of Buckingham: and a Lord High C. is now appointed only on the occurrence of great state ceremonies e. g. a coronation. The High C. of Scotland was an officer very similar to the C. of France and England. After the Rebellion, the offices of the inferior constables dependent on the High C., such as the C. of the Castle (q. v.), were abolished, but that of the High C. himself was expressly exempted, and still exists in the noble family of Errol. The privileges attaching to this office are now entirely honorary; but in virtue of it, the Earl of Errol is said to be the first subject in Scotland after the blood-royal; and on the occasion of the visit of King George IV. to Edinburgh, the then earl was allowed to take precedence of the possessors of all other hereditary honors. The present Earl of Errol is the 22d High C. of Scotland.

CONSTABLE OF A CASTLE was the keeper or governor of a castle belonging to the king or to a great baron. These offices were frequently hereditary; thus there were constables or hereditary-keepers of the Tower, and of the Castles of Dover, Windsor, &c.—CONSTABLE OF THE HUNDRED, and CONSTABLE OF THE VILL, were the predecessors of the high and petty constables of later times. The statute of Winchester (13 Ed. I. st. 2 c. 6), by which the office of high constable is usually, though probably not correctly, said to have been first introduced, ordains that in every hundred or franchise there shall be chosen two constables, to make the view of armor, and to see to the conservation of the peace. The petty constable exercised similar functions within the narrower limits of the township or parish, and was subordinate to the high constable of the hundred. The high constables are appointed by the courts leet of the franchise or hundred over which they preside; or, in default of such appointment (7 and 8 Vic. c. 33, s. 8), by the justices at their special sessions. The appointment of petty constables is by 5 and 6 Vic. c. 109, and 18 and 14 Vic. c. 20, given to justices, who are directed annually to require from the overseers of parishes a list of those within the parish qualified and liable to serve as constables. When not specially exempted, every able-bodied man, between 25 and 55 years of age resident in the parish, and rated to the poor or a tenant to the value of £4 per annum, must be included in this list. These lists are to be revised by the justices, who shall choose therefrom such number of persons as they deem requisite. No person who has served shall be liable to serve again till all the others are ex-

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hausted. Certain penalties are imposed by the act on those who shall refuse to serve, and an oath of office is prescribed. This act entirely supersedes the ancient method of appointing petty constables.—SPECIAL CONSTABLES are persons sworn in by the justices to preserve the peace, or to execute warrants on special occasions. By 1 and 2 Will. IV. c. 41, and 5 and 6 Will. IV. c. 48, any two justices of the peace who shall learn, on the oath of a credible witness, that a tumult, riot, or felony has taken place, or is apprehended, may, if they are of opinion that the ordinary officers are insufficient, swear in as many householders or others as they may think fit (not belonging to the classes of persons exempted from the duties of ordinary petty constables) to act as special constables for a limited time or for a particular place. The lord-lieutenant may also, by direction of one of the principal secretaries of state, cause special constables to be appointed for the whole county, or any part of it, in which case exemptions may be disallowed. For county constabulary, see POLICE.

CO'NSTANCE, Lake (called by the Germans *Bodensee*, or *Bodmansee*, from the old castle of Bodman—the *Lacus Brigantinus* of the Romans), lies on the north side of the Alps of Switzerland, and forms a meeting-point of the five territories—Baden, Würtemberg, Bavaria, the Tyrol, and Switzerland. It has an elevation variously estimated at from 1250 feet to 1385 feet above the sea. Lake C. is traversed by the Rhine from east to west; its greatest length is about 44 miles, utmost breadth 9 miles, and depth 964 feet. It is divided into the upper and lower lakes, the latter of which extends from Constance to Stein. Anciently, the lake was more extensive toward the south than now. In the 4th c., it is said to have extended as far as Rheineck, now some miles distant from the shore. The shores are formed by hilly lands, with low tracts at the months of the Rhine and smaller rivers. Cornfields, vineyards, pastures, orchards, and wooded declivities, with here and there the ruins of old castles interspersed, surround the lake. The water has a dark-green hue, often rises suddenly some ten or twelve feet during a thaw, and rolls in high waves during the prevalence of a strong south, north-west, or east wind. Without visible cause, it sometimes rises and falls to a considerable degree. In one hour, in 1770, it rose between 20 and 24 feet above the ordinary level. It is seldom frozen, except in very severe winters. The lake contains sixty kinds of aquatic fowl; twenty-five species of fish, including fine salmon, and salmon-trout; and several species of shell-fish. Since 1824, steam-navigation has added to the facilities of commerce across the lake, and its commercial importance has been greatly increased by the opening of a railway from Friedrichshafen, by Ulm and Stuttgart, to Heilbronn.

CONSTANCE, or Kostnitz (anciently *Constantia*), a city of Baden, once a free imperial city, is situated on the south shore of the Lake of Constance, at the place where the Rhine connects the upper and lower lakes together. C. is one of the most ancient towns in Germany, but it is very much decayed, its population, once 40,000, being now not more than (1871) 10,052. Its cathedral was erected in the 11th century. C. is notable in history for the ecclesiastical council held in 1414—1418. The object of the Council of C. was to put an end to the disorders in the popedom and in the election of popes, and also to prevent the spread of the doctrines of Huss. There assembled, with the Emperor Sigismund and Pope John XXIII., 26 princes, 140 counts, more than 20 cardinals, 7 patriarchs, 20 archbishops, 91 bishops, 600 prelates and doctors, and about 4000 priests. The three rival popes, John XXIII., Gregory XII., and Benedict XIII., were deposed, and Martin V. was elected. Huss and Jerome of Prague were condemned and burned. The emperor was disappointed in his hope of a thorough ecclesiastical reform, and the Council of Basel was afterwards called to carry on the work which the Council of C. had failed to accomplish. The hall in which the council met is now the market-hall of Constance. C. has manufactures of silk, cotton, and watches, active fisheries, and the cultivation of vineyards and gardens employs a considerable number of the inhabitants.

CO'NSTANT is the name given, in mathematical analysis, to a quantity which remains the same for all cases of the problem, in opposition to a variable. Thus, in questions about the fall of bodies in given times, the force of gravity is a constant quantity. In the integral calculus, the name of constants is given to those quantities which, after integration, are annexed to the integral.

CONSTANT DE REBEQUE, Henri Benjamin, one of the most distinguished

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political writers and orators of France, was born at Lausanne on the 25th October 1767. Educated in a German college, he afterwards spent some time at Edinburgh University, and here he is supposed to have imbibed those ideas of political freedom which guided him through life. In 1796, he published in Paris a pamphlet on the government then existing, which brought him into note; and three years later, he was placed on the "Tribunat" by Napoleon, who, however, two years after, dismissed and banished him for the spirit he displayed in resisting the First Consul's encroachments on liberty. During his banishment, he travelled for some time with Madame de Staël, and afterwards settled in Germany. In 1818, he published his celebrated pamphlet, "On the Spirit of Conquest and Usurpation." In 1814 he returned to Paris, where he wrote several pamphlets in favor of constitutional liberty, which he maintained was enjoyed under Louis XVIII. Napoleon's government he described as a "government of Mamelukes," and the emperor himself as "a Genghis Khan." Yet during the Hundred Days he became a councillor of state, and assisted in framing the "Acte Additionnel." In 1819, he was elected a deputy, became ultimately leader of the opposition, and in this capacity gained unbounded popularity. C. de R. was a true patriot. He loved liberty better than monarchies or mobs, and therefore, while he opposed the despotic measures of the government of Charles X., he deplored the revolution of July 1830. He died December 1830. As a public speaker, C. de R. was in his day the clearest and most persuasive advocate of constitutional principles in France. As a political writer, he was even fully more effective than as a speaker. Among his works may be mentioned, "Discours Phononcés à la Chambre des Députés" (2 vols., Par. 1828), the "Cours de Politique Constitutionelle" (4 vols., Par. 1817—1820, 2d ed. 1833), in which are collected his minor works on representative government. Among his most ambitious works are "Mémoires sur les Cent Jours" (Par 1820), "De la Religion considérée dans sa Source, ses Formes, et ses Développements" (5 vols., Par. 1824—1831), to which posthumous work his "Du Polythéisme Romain, considérée dans ses Rapports avec la Philosophie Grecque et la Religion Chrétienne," forms a kind of supplement.

CONSTA'NTIA, a district of Cape Colony, in South Africa, laying on the eartern and north-easteru slopes of Table Mountain range, and distant from Cape Town about 12 miles. C. consists of only two estates, Great Constantia and Little Constantia, which have long been famed for the quality of the wines produced upon them. Many attempts have been made in other parts of Cape Colony, as also in France and the south of Europe, to produce a wine similar in quality and flavor to the C., but all have failed; and it is now known that not only to the quality of the C. grape, but also to the character of the soil, as well as to the peculiarly genial exposure of the district, the characteristic excellence of the C. (proper) wines is traceable. The soil of the estates is rich in alkalies to an extent perceptible in the grape itself, and the vineyards have a very equable exposure, being sheltered from all sudden changes of temperature by spurs of the great granite mountain. The grapes under this shelter ripen very uniformly, so that the earthy taste, which spoils the character of other Cape wines, and which is produced by using unpicked grapes of different degrees of ripeness in the same bunch, does not attach to the C. wines.

Although the attempts made on other farms in the colony to produce wine similar to that of C., have failed in so far as the peculiar flavor as well as lusciousness of real C. are concerned, yet they have led of late to great improvements in the quality of several of the South African wines; and where care continues to be bestowed, and the habits of different vines in relation to soil and exposure are more studied, we have evidence in the quality of the improved "Pontac," and other wines of Wynberg, of what can be accomplished with increased labor by Cape Colony as a wine-producing country. Statistics of the wine trade of this settlement shew, however, that only a small quantity of genuine wines finds its way into the market —much of that which passes under the name being similar but inferior Cape wines. The produce of the C. vineyards sells even in the colony at not less than 6s. per bottle.

CONSTANTI'NA, a town of Spain, in Andalusia, situated in a mountainous district, about 40 miles north-north-east of Seville, to which city it supplies much fruit and ice. It has manufactures of leather and soap, distilleries, flour-mills, &c. Pop. 7000.

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CONSTANTI'NE, the capital of a province of the same name (the easternmost province of the French colony of Algeria), is situated on a hill with flat summit, three sides of which are washed by the Rummel, flowing through a deep and narrow ravine, and the fourth is connected by a natural mound with the surrounding mountains. Lat. 36° 22′ n., long. 6° 37′ e. It is 830 feet above the river, and 2162 feet above the sea. It is surrounded by walls constructed by the Arabs out of Roman sculptured stones, and a fine old Roman bridge spans the ravine on one side. The streets, as in other towns of Barbary, are very narrow and dirty, and the houses mean. An old church in the Byzantine style is included in the citadel. C. was anciently one of the most important towns of Numidia, called *Carta* by the Carthaginians, *Cirta* by the Romans, and was long a royal residence. It was destroyed in the wars of Maxentius against Alexander about 311 A. D., but was soon rebuilt by Constantine the Great, from whom it derives its present name, and continued to subsist, and was a flourishing town in the 12th century. Subsequently, it shared in general the fortunes of Algeria (q. v.) C. has manufactures of woollen cloths, saddlery, and other articles of leather. Population (1872) 33,251, of whom some 7000 are Europeans.

CO'NSTANTINE I., Flavius Valerius Aurelius, surnamed "the Great," a Roman emperor, was born 272 or 274 A.D., at Naissus, in Mœsia. He was the eldest son of Constantius Chlorus, and first distinguished himself by his military talents under Diocletian, in that monarch's famous Egyptian expedition, 296; subsequently he served under Galerius in the Persian war. In 305, the two emperors, Diocletian and Maximian, abdicated, and were succeeded by Constantius Chlorus and Galerius. Galerius, who could not endure the brilliant and energetic genius of C., took every means of exposing him to danger, and it is believed that this was the period when he acquired that mixture of reserve, cunning, and wisdom, which was so conspicuous in his conduct in after-years. At last C. fled to his father, who ruled in the West, and joined him at Boulogne just as he was setting out on an expedition against the Picts in North Britain. Constantius died at York, July 25, 306, having proclaimed his son C. his successor. The latter now wrote a conciliatory letter to Galerius, and requested to be acknowledged as Augustus. Galerius did not dare to quarrel with C., yet he granted him the title of Cæsar only. Political complications now increased, and in a short time no less than six emperors were "in the field"—viz., Galerius, Licinius, and Maximin in the East, and Maximian, Maxentius his son, and Constantine in the West. 308 A.D. Maxentius having quarrelled with his father, forced him to flee from Rome; he took refuge with C., but was ungrateful enough to plot the destruction of his benefactor. This being discovered, he fled to Marseille, the inhabitants of which city gave him up to C., who put him to death, 309 A.D. Maxentius professed great anger at the death of his father, and assembled a large army, with which he threatened Gaul. Crossing the Alps by Mont Cénis, C. thrice defeated Maxentius—first near Turin, then under the walls of Verona, and finally in the vicinity of Rome, 28th October 312, Maxentius himself in the last of these engagements being drowned in an attempt to escape across the Tiber. C. now entered the capital, disbanded the Prætorians, and adopted other judicious measures for allaying the public excitement. He was also honored with the title of *Pontifex Maximus*, or Supreme Dignitary of the Pagan Hierarchy.

C. was now sole emperor of the West. Similarly, by the death of Galerius in 311, and of Maximin in 313, Licinius became sole emperor of the East. In 314, a war broke out between the two rulers, in which Licinius had the worst, and was fain to conclude a peace by the cession of Illyricum, Pannonia, and Greece. C. gave Licinius his sister Constantina in marriage, and for the next nine years devoted himself vigorously to the correction of abuses in the administration of the laws, to the strengthening of the frontiers of his empire, and to the chastising the barbarians, who learned to fear and respect his power. In 323, he renewed the war with Licinius, whom he defeated, and ultimately put to death. C. was now at the summit of his ambition, the sole governor of the Roman world. He chose Byzantium for his capital, and in 330 solemnly inaugurated it as the seat of government, under the name of Constantinople or City of Constantine. In 324, he committed a deed that has thrown a dark shade over his memory. He had a gallant and accomplished son, named Crispus, who was exceedingly popular, and him, along with Constan-

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tina and others, he put to death on a charge of treason. Niebuhr shews that it was not unlikely Crispus cherished ambitious designs. Next year occurred the great Council of Nice. C. sided with the orthodox fathers, probably for very heterodox reasons. As yet he was a pagan, but his sense of justice, and his conviction of the growing importance of the Christians, both as a moral and political element in the life of the empire, had from the very first induced him to protect them. As early as 313 he had everywhere granted them toleration, and since then continued to favor them more and more decidedly. As president of the Nicene Council, he opposed the Arians, on political grounds, as the weaker party; but not being theologically interested in the dissensions, he refrained from active persecution. During the latter years of his life, Christianity became the state-religion, the pagan temples were closed, and sacrifices forbidden. Yet it was only a short time before his death, which occurred 22d July 337, that he would allow himself to be baptized.

The question has been much discussed, whether or not C. was a Christian. The truth seems to be, that he looked upon religion as a *statesman*, who feels that his first duty is to rule the nation over which he is set in an orderly and peaceable manner. Had paganism been still in its prime, and possessed any real political vitality, it is not likely that a man of C.'s secular temperament would have trembled himself in regard to the new faith; but when he found that the latter was making rapid progress in spite of the fiercest persecution, he must have felt it wisest, and probably also conceived it *right*, to protect and favor it. But he continued to the last addicted to many pagan superstitions. As an emperor, however, he ranks very high. He was beloved by his people, for whose welfare he seems to have honestly labored. Severe and even sanguinary towards individuals, he was just and moderate towards nations. He conquered every enemy, organised a new and better mode of government for his vast dominions, crushed all conspiracies and revolts, and passed the close of his life in peace.

CONSTANTINE, Paulowitch, a Russian grand-duke, born 8th May 1779, was the second son of the Emperor Paul I. He early distinguished himself by activity, intellectual ability, and a gallantry bordering on foolhardiness, of which he gave remarkable proof at the battle of Austerlitz. After the congress of Vienna, the government of Poland was entrusted to him by his brother, the Emperor Alexander. In January 1822, he executed a private deed by which he resigned his claims to the throne in the event of Alexander's death; and when that event took place in 1825, he adhered to this resignation, although he had meanwhile in his absence been proclaimed emperor in St Petersburg. The succession thus fell to his younger brother Nicholas. The character of C.'s administration in Poland was not such as to conciliate any class of the people, and a widely ramified conspiracy was formed. The French Revolution of 1830 supplied the spark which set all in flame, and C. was obliged to flee for his life, but he returned in command of the army of reserve. He died, however, of cholera at Vitebsk, on 27th June 1831.

CONSTANTINE, Nicolaewitch, grand-duke of Russia, born 21st September 1827, is the second son of the late emperor Nicholas, and the brother of Alexander II. He is grand admiral of the Russian fleet, and holds besides innumerable military offices. During the Crimean war, he commanded the Russian fleet in the Baltic, and directed the defensive preparations which held the English and French armaments in check before Cronstadt. The leader of the old Russian party, he strenuously opposed the concessions made to the Western Powers. In 1857, however, he visited the courts of England and France, and in 1871 he paid a second visit to England. On the outbreak of the Polish insurrection in 1862, C. held the office of viceroy of Poland for three months. In January 1865 he was appointed president of the council of the empire.

CONSTANTINO'PLE, called by the Turks *Stamboul* or *Istamboul*, was originally called *Byzantium* (q. v.). In 330 A.D., the Emperor Constantine made it the capital of the Roman empire, and called it after his own name, Constantinople. From this period dates its importance. It continued thenceforth to be the residence of the Roman, and afterwards of the Byzantine emperors, till in 1453 it was taken by the Turks. Since that time it has been the capital of Turkey, and the principal residence of the sultans. It is situated in lat 41° n., and long. 28° 59′ e., on the European side of the Channel of Constantinople or Thracian Bosporus, near to its

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opening into the Sea of Marmora. A narrow arm of the sea, called the Golden Horn, extends about five miles into the land, and forms a safe and most commodious harbor, with water of sufficient depth to float the largest men of war. C. proper, to which Europeans give the name of Stamboul to distinguish it from the northern and eastern suburbs of C., lies entirely on the southern side of the Golden Horn, and is protected by a wall built during the time of the Byzantine empire, and partially restored by the Turks. The wall is about 12½ miles in circuit, and is pierced by 28 gates, amongst which that of Top-Kapussi, formerly that of St Romanus, has a historic interest, as being the one through which the Turks entered when they stormed the city, and were the last of the Palæologi died in the fight. The suburbs of Galata, Pera, and Top-hanêh are situated on the northern side of the Golden Horn. On the Asiatic side of the Bosporus lie Scutari and Kadiköi (the ancient Chalcedon), and to the north-west of the city lies the town of Eyub. The city itself is built on hilly ground, and from this circumstance, and its numerous gardens, cypresses, mosques, palaces, minarets, and towers, it presents, especially as seen from the side of the Golden Horn, a very splendid appearance. The scenery of the Thracian Bosporus is of almost unrivalled beauty; and the panorama, of which C. forms the principal part, is such as is perhaps nowhere else to be seen in the world. But a nearer approach reveals the characteristics of an eastern town—narrow, crooked, filthy streets, and miserable houses of wood and clay. Since the Crimean war, however, C. has been wonderfully improved. Great fires, which occurred on the 6th and 7th September 1865, the 3rd May 1866, and on the 5th June 1870, swept away square miles of old wooden houses on both sides of the Golden Horn. On these spaces handsome stone houses have been built in the modern European style; but this has not been done with much system, and there are in all directions great gaps filled with miserable wooden huts, or left as waste places. The formation of tramways has, however, tended to connect the improved districts by wider thoroughfares, and to form a general plan which is gradually giving to C. the appearance of a European city. C. contains many fine buildings, among which may be mentioned the Serâglio, occupying the position of ancient Byzantium, and measuring about three miles in circumference: the former Church of St Sophia, now a mosque, is a most magnificent structure, in the form of a Greek cross, 269 feet long by 243 broad, and has a flattened dome, greatly admired for its lightness, 180 feet above the ground. The other important mosques are those of Solyman, Achmed, Sultan Mohammed II., and Eyub. The two obelisks of the ancient Hippodrome, called by the Turks the *Atmeidan;* the Castle of the Seven Towers, now in a state of dilapidation; the aqueducts erected by the Emperor Valens; the cistern of Philoxenus, with 424 columns of marble; and the numerous fountains, are among the other most notable objects in Constantinople. The covered bazaars of C. are very numerous, and the goods are displayed with wonderful attractiveness. One feature of C. is its vast number of lean and hungry dogs which haunt the streets. The dogs are the common property of the city, and they do a considerable portion of the scavenging. Galata, which was founded by the Genoese as a republic in the Byzantine times, is the residence of European merchants and the principal place of trade. It contains many great warehouses, shops and dwelling houses, but is, if possible, even more filthy than C. proper. Bridges of boats connect the opposite sides of the Golden Horn. Further eastward, on the Bosphorus, lies Top-hanêh, with the imperial cannon foundry, a beautiful mosque, and an interesting fountain. On the hill behind Galata and Top-hanêh is situated Pera, the residence of the foreign ambassadors. Two-thirds of Pera burned to the ground by the fire of 5th June, 1870. Three thousand houses were then entirely destroyed, including that of the English ambassador, and 40,000 persons were left without shelter. Before the fire Pera had a European population of 70,000, which was reduced by the catastrophe to more than one half. Pera is not being built on its old site, but new streets are spreading round it and Galata. In 1875 Pera was connected with C. by an under-ground railway 672 yards long, which is reckoned to convey 30,000 passengers daily.

The population of C. and its suburbs has been variously estimated. In 1873 it probably contained from 750,000 to 800,000 inhabitants, of whom about one-half were Mohammedans, one-fourth Greeks and Armenians, one-eighth Franks, and one-eighth Jews. The mosques are more than 300 in number. There are several Greek

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churches, under a patriarch with twelve synodal bishops. The patriarch is not only the spiritual, but in part also the temporal head of the Greek subjects of the Porte. C. is the residence also of an Armenian patriarch, and there are several Roman Catholic and Protestant places of worship. There are in connection with the mosques about 300 *medreuses*, or schools for the ulemas; there are also some 400 *mekteb*, or Turkish elementary schools; and among the other educational institutions is a school of medicine conducted by Germans, which has been the means of much good. Among the benevolent institutions are numerous *imarets*, where food is provided for the poor, and hospitals for the sick of several European nations. There are public libraries, both Turkish and Greek, of which that of the Seraglio is particularly rich in the treasures of oriental literature; and there are several Turkish and European printing-presses. The public baths and coffee houses are exceedingly numerous. Some of the peculiar manufactures of the East are carried on in leather, carpets, weapons, &c. But all the manufactures of Western Europe abound in its markets. The trade of C. has, since the Crimean war, been steadily increasing, but is by no means so extensive as might be expected from its population and situation. The burden of the vessels entering and of those clearing the port is estimated at about four millions of tons. The trade is chiefly in the hands of Greeks, Italians, Austrians, British, French, and Germans.

C. is now connected by railway with the interior of Northern Turkey, and the north-western part of Asia Minor. The Rumelian Railway, which runs from Stamboul to Bellova, a distance of 560 kilometres, was opened on the 17th June 1873, and passes through one of the richest but worst cultivated parts of Europe. It will be first connected with Western Europe by a branch line starting from Tirnova, passing Yamboli, meeting the Ruschuk-Varna Railway at Schumla, and crossing the Danube by a bridge at Giurgevo to join the Rumanian termination of the great network of the continental railways. This line has also a branch from Adrianople to Dedeagatch, on the Ægean; and will ultimately be connected, at Sophia, with a continuation of the line which already joins Salonica and Uskub. C. will thus soon have railway communication with a great part of Turkey. From Scutari a railway has been constructed to Ismidt (the ancient Nicomedia), in Asia Minor, to be continued to Isnik (the ancient Nicæa), on the shores of the Lake of Ascania.

CONSTELL'ATION (Lat. *con*, together, and *stella*, a star), a group of stars. The stars which stud the firmament have, from a time earlier than authentic records can trace been formed into artificial groups, which have received names borrowed from fancy or fable. These groups are called constellations. Though quite devoid of anything like systematic arrangement, this traditional grouping is found a sufficiently convenient classification, and still remains the basis of nomenclature for the stars among astronomers. Before the invention of almanacs, the risings and settings of the constellations were looked to by husbandmen, shepherds, and seafaring men as the great landmarks of the seasons, and consequently of the weather which each season was expected to bring with it (see Job xxxviii. 31); and it is not surprising if the storms or calm weather that usually accompanied such seasons were connected in the popular imagination with the influence of the stars themselves, or the beings with whom superstition or fable identified them. Thus, the risings and settings of Bootes with the bright star Arcturus, which took place near the equinoxes, portended great tempests. See Virgil's "Georgics," i. 204. The great heat in July was ascribed to the rising of Canis the Dog, with its bright star Sirius. See CANICULAR DAYS, and HELIACAL RISING. The appearance of the twins, Castor and Pollux, was hailed as the harbinger of fair summer weather.

Almost all nations have, from early times, arranged the stars into constellations, but it is chiefly from the nomenclature of the Greeks and Romans that our own is derived. Eudoxus, a contemporary of Plato, about 370 years B. C., gave a description of the face of the heavens, containing the names and characters of all the constellations recognised in his time. Though this production is lost, a poetical paraphrase of it, written about a century later by Aratus (q. v.), is still extant. This poem describes twelve zodiacal constellations (see ZODIAC), with twenty in the northern hemisphere, and thirteen in the southern. The next enumeration occurs in the "Almagest" of Ptolemy, which includes the preceding, with three additional, one northern and two southern constellations, making in all 48. These are the ancient stellar groups. Large accessions have been made to the nomenclature in

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modern times, in consequence of maritime discovery having made us acquainted with constellations in the southern hemisphere which never rose upon the world known to our ancient authors. In 1751, Lacaille went to the Cape for the purpose of making a catalogue of the southern stars, and forming them into constellations—an undertaking which he prosecuted with great ardor for nearly four years at the expense of the French government. Flattery has also contributed towards the stellar nomenclature. Upon the restoration of Charles II., the evening before his return to London, Sir Charles Scarborough, the court physician, was gazing upon a star in the northern heavens, which shone with greater luminosity than usual, as might be expected from a loyal star on such an occasion. This, in connection with a few others, was formed into Cor Caroli, the Heart of Charles II., by Halley, at the doctor's recommendation. The chief constellations will be noticed under their several names. See ARIES, URSA MAJOR, &c. The fanciful figures from which the constellations are named, are depicted on celestial globes and maps of the heavens. In the older writers, Constellation signifies the relative positions of the planets at a given moment. See ASPECT.

CONSTIPA'TION, a state of the system marked by an irregular and sluggish action of the bowels upon their contents, due either to defective secretion of the juices of the intestinal mucous membrane, or to an imperfection of the peristaltic movements (see DIGESTION). Sedentary habits predispose to C., as also does the use of animal food in too great a relative amount. The use of brown bread, or of lentils, oat-meal porridge, of green vegetables and salads, or of ripe fruits; the plentiful employment of salt, or of saline drinks, or of many natural mineral waters; and active exercise, especially by walking or riding on horseback in the open air, tend to avert this disease. A favorite remedy with some is the use of a cloth wrung out of cold water, and applied to the abdomen; this, as used at hydropathic establishments, is called an "abdominal compress," and is worn under a bandage of macintosh cloth, to keep the moisture from escaping, during the earlier part of the day. But to many persons affected with C., and unable from circumstances to follow out the plan of life here indicated, and to many others in whom the disease does not yield to these means, the use of laxatives, or mild cathartics (q.v.), is almost a necessity; and it is satisfactory to know that these remedies, if judiciously selected, and not employed so as to produce over-action, may be taken during very many years without any of the bad effects often ascribed to them.

Constipation in the lower animals depends, as in man, on imperfect secretion from, or motion of, the intestinal walls. In the horse, it is usually accompanied by Colic (q. v.), and, when long continued, leads to Enteritis (q. v.) The appropriate remedies are soap and water clysters given every two hours; smart friction and clothe rung out of hot water applied to the abdomen, with three drachms of aloes, and one of calomel, given in gruel, and repeated in sixteen hours, if no effect is produced. Give, besides, walking exercise; restrict the amount of dry solid food, but allow plenty of thin grnel or other fluids, which may be rendered more laxative by admixture with treacle or a little salt. Similar treatment is called for in dogs, cats, and pigs. In cattle and sheep, digestion principally takes place in the large and quadrisected stomach; the bowels, accordingly, are little liable to derangement; and C., when occurring in these animals, generally depends upon impaction of dry hard food between the leaves of the manipilles, third stomach or fardel-bag. The complaint is hence called *fardel-bound*. It results from the eating of tough and indigestible food, such as ripe vetches, rye grass, or clover; it prevails in dry seasons, and on pastures where the herbage is coarse and the water scarce. It occurs amongst cattle partaking freely of hedge-cuttings or shoots of trees, hence its synonym of *wood-evil*. From continuous cramming and want of exercise it is frequent in stall-feeding animals; whilst from the drying up of the natural secretions, it accompanies most febrile and inflammatory diseases. The milder cases constitute the ordinary form of indigestion in ruminants, are accompanied by what the cow-man terms *loss of cud*, and usually yield to a dose of salts given with an ounce or two of ginger. In more protracted cases, rumination is suspended, appetite gone, constipation and fever are present. There is a grunt noticeable, especially when the animal is moved, and different from that accompanying chest-complaints, by its occurrence at the commencement of expiration. By pressing the closed fist upwards and forwards beneath the short ribs on the right side, the round,

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hard, distended stomach may be felt. This state of matters may continue for ten days or a fortnight, when the animal, if unrelieved, becomes nauseated, and sinks. Stupor sometimes precedes death, whilst in some seasons and localities most of the bad cases are accompanied by excitement and frenzy. In this, as in other respects, the disease closely corresponds with stomach-staggers in the horse.

Treatment.—Give purgatives in large doses, combining several together, and exhibiting them with stimulants in plenty of fluid. For a medium sized ox or cow, use ½ lb. each of common and Epsom salts, ten croton beans, and a drachm of calomel, with three ounces of turpentine; and administer this in half a gallon of water. If no effect is produced in twenty hours, repeat the dose. Withhold all solid food; encourage the animal to drink gruel, sloppy mashes, treacle and water; and give exercise, clysters, and occasional hot fomentations to the belly.

CONSTITUENT ASSEMBLY. See ASSEMBLY, NATIONAL.

CONSTITUTION, in Politics (*constitutio*, from Lat. *constituere*, to set up or establish). In its modern acceptation C. signifies a system of law established by the sovereign power of a state *for its own guidance*. Such being the ultimate object of a C., its proximate objects, generally stated, are to fix the limits and define the relations of the legislative, the judicial, and the executive powers of the state, both amongst themselves and with reference to the citizens of the state, regarded as a governed body. Among the Romans a C. was at first nearly synonymous with the edict of a prætor (see EDICT), and even under the empire signified only an imperial edict or decree. In continental countries, since the formation of the federal government of the United States of America, or at all events since the first French Revolution, the idea of a C. has been generally that of a body of written public law, promulgated at once by the sovereign power. See CODE and ASSEMBLY, NATIONAL. In Great Britain it is the whole body of the public law, consuetudinary as well as statutory, which has grown up during the course of ages and is continually being modified by the action of the general will as interpreted and expressed by the parliamentary representatives of the nation. Much confusion is often introduced into our conceptions of the action of the English and other mixed governments by representing the three elements of which they are generally composed—the monarchical, aristocratic, and democratic (King, Lords, and Commons)—as the centres of three independent sovereignties, whereas they are only three organs through which the one sovereignty finds expression. There is and can be in an independent state, but one sovereignty—one centre of power—viz., the general will of the nation. Opposition to this will, from whence-soever it may come, within the state, is treason in the individual and rebellion in the mass; whereas the vindication of this will by its own act may be revolution, but can never be rebellion. Another source of error consists in supposing this general will to be the numerical aggregate of all the individual wills in the community. It is, on the contrary, the sum of all the wills, not numerically but really, making allowance, that is to say, for the fact that one individual, from the greater clearness of his convictions and strength of his character, often contributes to this sum or mass of volition, ten times as much as another individual.

But though the idea of a mixed government is generally associated with that of a C., it does not seem to be inseparable from it. We are not entitled, for example, to deny the name of a C. to a system which is apparently the result of one single will, if to that will the general will has freely confided the task of determining the rules by which it shall be governed. Assuming that the late emperor of the French was invested with supreme power by this ultimate sovereign, the general will, the government which he established was, for the time being, the C. of France. But inasmuch as France had, under the imperial system of government, no parliamentary machinery for effecting desired or desirable changes in its C., the "right of revolution," as it is called, became a necessity on the part of those who conceived that they embodied and were in a condition to express the general will. Disorderly as it may seem to us, it was really within the limits of the C., as constitutional as the C. which at any moment it might have overthrown. In a parliamentary government like that of England, however, the right of revolution emerges only when the self-modifying powers of the C. are obstructed or opposed by the executive, as took place in 1688. Whilst in pure monarchies it hangs permanently over the head of the executive, even when acting in accordance with the C., in a free country resist-

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ance is rebellion in all cases in which the machinery which the C. possesses for its own modification is unimpeded in its action. Of resistance of this latter kind, the events that culminated in the late American civil war furnish an example.

For a historical account of the English C., see ENGLAND; see also PARLIAMENT, CONGRESS, CODE, CORTES, &c.

CONSTITUTIONS, APOSTOLICAL. See APOSTOLICAL CANONS AND CONSTITUTIONS.

CONSTITUTIONS OF CLARENDON. SEE CLARENDON, CONSTITUTIONS OF.

CO'NSUBSTA'NTIATION. See TRANSUBSTANTIATION.

CONSUETU'DINARY LAW, is that law which derives its binding character, not from the expressed, but from the tacit consent of the general will of the community. As it is generally transmitted from age to age by oral tradition and universal custom, and is rarely embodied in any positive enactment, C. L. is often spoken of as unwritten law (*lex non scripta*). The customary laws of Normandy, Brittany, and some other provinces of France, however, were reduced to writing; and with us much of the common law, both of England and Scotland, now rests on statute, as well as on custom and usage. Even in modern practice, usage is often resorted to as the best interpreter of law. Of this a familiar example is the important part assigned to mercantile usage in construing the law-merchant. In this case, the custom must generally be established by evidence, in place of being taken for granted as are the laws of primogeniture, legitim, terce, courtesey, and the like. The effect of custom in repealing statutes will be considered under DESUETUDE. See also COMMON LAW.

CO'NSUL, the title of the two highest ordinary magistrates in the Roman republic. The etymology of the word cannot be precisely determined; thus much, however, seems clear, that it implies that there were more than one—that there were colleagues. The idea of two supreme magistrates, or joint-presidents of the state, seems to have been interwoven with the earliest conceptions of political organisation in Rome. According to tradition, there were at first two kings; and the constitution of Servius is said to have provided for the sovereign power being again divided between two functionaries. But it was not till after the expulsion of Tarquin that Lucius Junius Brutus and Lucius Tarquinius Collatinus were chosen joint-heads of the state. These chief-magistrates seem to have been at first called *prætores* (leaders, i. e., of the armies), and the title of *consules* to have been introduced about 800 B. C. At first, the consuls seem to have differed from the kings in little else than their limited tenure of office, and the power which their fellow citizens retained of calling them to account at its termination. They never assumed the golden crown, but their dress in almost every other respect was regal, and they had ivory sceptres, surmounted by eagles. In public assemblies, they occupied a sort of throne (*sella curulis*), and in the senate they presided and sat on elevated seats. They made peace and negotiated foreign alliances, had the supreme command of the army, and appointed the public treasurers. They likewise exercised the judicial functions of royalty. In their capacity of supreme judges they continued to be known as *prætores*, until ultimately separate magistrates with that title were appointed. The symbol of their authority was the bundle of rods (*fasces*), with the axe in the centre, which was carried before them by twelve lictors. For a considerable period, the consuls were chosen exclusively from the *populus* or patricians, as opposed to the *plebs*; and during the long struggle between the patricians and plebeians, they sided invariably with their own order. At length, however, two plebeian officers, called *tribuni plebis*, were appointed as a sort of democratic rivals to the aristocratic consuls. To them was assigned the duty of presiding in the assemblies of the plebeians, as the consuls did in the other assemblies; and though they could not dictate, they were entitled by their *veto* to arrest measures proceeding on consular or senatorial authority. The result of this rivalry was, that the consulship was opened to plebeians; and from 172 B. C. down to the period of the empire, the consuls were frequently plebeians. In accordance with the ordinary course of political development, the organization of the Roman state became more complicated, in proportion as it became impossible for the C. to discharge in person the various duties which in the beginning always centre in the possessors of supreme power.

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In 442 B. C. censors (q. v.) were appointed. In 365, prætors had the chief judicial functions of the consuls assigned to them. In the government of the provinces, the aid of the former consuls was called in, the C. thus appointed having the title of *pro-consul*. In sudden and critical emergencies, the consuls were either superseded by a dictator (q. v.), or absolute power for the occasion was conferred on them by the decree of the senate, which ran in the famous formula: *Videant consules ne quid respublica detrimenti capiat*—"Let the consuls look to it, that the state take no harm." The oath which the consuls took on entering office they were obliged to repeat as a declaration, not of intention but of fact, on quitting it at the end of the year. The consuls were inaugurated by a great procession to the Capitol and a sacrifice to Jupiter Capitolinus. The shadow of the consulate survived the downfall of liberty; but the election of the consuls was taken from the people and conferred on the senate. Then their number was increased; they were divided into classes—*C. ordinarii, suffecti, honorarii*, &c.—till at last the office became a mere honorary appointment conferred by the emperor.

The title of C. was revived in the French republic. See CONSULATE.

CONSUL, Mercantile, the name given to those officers whom the state maintains in foreign countries for the protection of its trade, and vindication of the rights of its merchants, and to whom the further duty is assigned of keeping the home government informed of all facts bearing on the commercial interests of the country. The practice of appointing such officers originated among the trading communities of Italy about the middle of the 12th c., and gradually extended itself; and in the 16th c., had been adopted by all the countries of Europe. In addition to their commercial duties, others of a more strictly political kind were frequently confided to consuls in places in which there was no ambassador or political agent. In almost all the countries of Europe, consuls are divided into consuls-general, consuls, vice consuls, and consular agents. The C.'s first duty on his arrival, is to exhibit his commission to the authorities of the country to which he is accredited, in order that he may obtain their sanction to his appointment. This sanction is communicated to him in a document called an *exequatur*, which secures to him the enjoyment of such "privileges, immunities, and exemptions as have been enjoyed by his predecessors, and as are usually granted to consuls in the country in which he is to reside." The general duties of English consuls are communicated to them in printed instructions. In these the C. is ordered to make himself conversant with the laws and general principles which relate to the trade of Great Britain with foreign parts and with the language and municipal laws of the country wherein he resides.

Further, it is his duty to protect his countrymen in the lawful exercise of their trade, to quiet their differences, to obtain the redress of injuries done them—failing which, to report the matter to the English ambassador at the court of that nation—and to forward to the Secretary of State for Foreign Affairs an annual return of the trade carried on at the different ports within his consulate, as well as a quarterly account of the market prices of agricultural produce during each week of the quarter, the course of exchange, &c. The C. must afford relief to British seamen or other subjects wrecked on the coast, and endeavor to procure them the means of returning to England. The commanders of Queen's ships touching on the coast are entitled to call on him for intelligence, and aid in procuring supplies of water, provisions, and the like; and it is his duty to endeavor to recover all wrecks and stores, &c., of Queen's ships, whether found at sea and brought into the port at which he resides, or thrown on the coast. As regards the "privileges and immunities" of a a C., it is doubtful whether he is in any case exempt from the civil jurisdiction of the state to which he is accredited; and in the case of a trading C., it is at anyrate plain that he is not. But a C. sent out from this country, and not engaging in trade, has always been exempted from the taxes of the country in which he resides. He is generally permitted to call in a guard when he requires it for his own safety, or the preservation of discipline; and in countries not inhabited by a European population, he has all the privileges of an ambassador. A C. can perform all the acts of a notary-public; all deeds executed by him being acknowledged as valid by our courts of law. The fiction is, that the consulate is the territory of the country from which the C. is sent, and consequently, that deeds and acts done within it, or under the C.'s seal, are done in England. Hence the marriage of British subjects recorded in the books of a British C. is a valid ceremony.

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In some cases, British consuls are allowed to trade: in others they are prohibited from so doing. The salary of consuls-general varies from £300 to £2000, the average being about £1000; the salary of a consul varies from £100 to £1500, and of a vice-consul from £50 to £800. A select committee of the House of Commons reported in 1872 that the consular service was still too varied in character and arrangements to be the subject of such organisation and classification as other branches of the civil service, but in event of such regulation and revision of the posts as was then recommended, suggested that it would be desirable to introduce changes in that direction. Though of opinion that some posts were underpaid, the committee was opposed to an indiscriminate raising of salaries.

CO'NSULATE (Lat. *consulatus*, consulship), (in France). The supreme magistracy of the French republic was established after the revolution of the 18th Brumaire (q. v.), and lasted to the coronation of Napoleon. On the sudden overthrow of the Directory with the constitution of the year III., the members of the Council of the Ancients and the Five Hundred, or rather those of them who approved of or submitted to that act of violence on the part of Bonaparte's grenadiers, appointed three consuls—Sièyes, Bonaparte, and Roger Ducos. This approach to a monarchical government was confirmed December 13, 1799, by the constitution of the year VIII., by which Bonaparte was made First Consul, with Cambacérès and Lebrun as second and third; each was elected for 10 years, and was re-eligible. The powers of the First Consul were made almost absolute. He promulgated the laws, appointed or dismissed ministers, ambassadors, members of the Council of State, military and naval officers, and all civil and criminal judges except justices of peace and members of the Court of Cassation. His income was fixed at 500,000 francs, and that of his inferior colleagues at 150,000 francs each. Bonaparte took up his residence at the Tuileries, and held a splendid court. By resolutions of the senate, in May 1802, Bonaparte was re-elected for 10 additional years, and in August of the same year was made First Consul for life. In the appeal made to the nation, out of 3,577,259 votes, 3,568,885 were in favor of Bonaparte. The adulation of the senate and people now knew no limit. Nothing but the imperial name and insignia were wanting to complete the picture of absolutism, and these were supplied May 18, 1804, when Napoleon was made emperor.

CONSU'MPTION, in medical language, Phthisis, Tabes, Marasmus (q. v.), and more particularly Phthisis Pulmonalis or pulmonary C., is a disease of great frequency and severity, which, in the civilised nations of Europe, produces from one-sixth to one-tenth of the total mortality in ordinary times. It is uncertain whether there is any part of the world, or any race of men, exempt from C.; this exemption having been at different times claimed for the inhabitants both of hot and cold climates, as for India, Australia, Canada, Iceland, &c., but in most instances in consequence of imperfect knowledge of the facts. On the whole, C. appears to be one of those diseases that have a tendency to increase, unless great care be taken to remove conditions unfavorable to the public health, with the increased aggregation of the human family, and with that extended intercourse which is one of the consequences of an advanced civilisation. Hence it is most frequent and most fatal in towns, and most of all in those that are near the great centres of intercourse; while in remote mountain districts, in islands cut off by a wide ocean from the general stream of human communication, it is commonly stated to be, and probably is, comparatively rare. As a rule, however, the presence of this dreadful scourge has almost invariably been discovered to a greater or less extent, wherever the causes of mortality have been carefully examined under enlightened medical superintendence; and we are still very far from having acquired such an insight into its laws of diffusion, as to be able to deduce from them any exact doctrine as to its causation. C. affects peculiarly the young, especially those in the first period of adult life; though it is nearly certain that the seeds of the disease are commonly sown in the constitution in youth, and even in infancy. Its relation to sex is variable, being apparently determined in part by the predominating occupations, and the habits of living, of the population. It is often observed to be plainly inherited from one or other parent, most frequently the mother; and it is one of the diseases which has been stated to be frequently developed as a consequence of the marriage of cousins or other near relatives, especially when the parental stock is itself tainted or not free from suspicion. In life-insurance, all

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these circumstances are usually carefully weighed by the medical officers of companies, as the grounds for admission or rejection of a candidate for insurance; and nothing is more certain to cause rejection, than a well-grounded suspicion of a consumptive tendency, either personal or derived from the parents, or shewn in brothers and sisters. It is therefore a fair subject for consideration, on grounds of ordinary prudence, as well as on those of moral and religious obligation, whether those afflicted with this malady, or strongly predisposed to it, ought to enter into the married state, and to incur the probable afflictions and responsibilities connected with the maintenance of an unhealthy family. It has even been proposed to legislate on this subject; but sober-minded political economists will probably always consider that it is in vain to constrain by laws the strongest instincts of humanity, especially when the application of the law must depend upon such refined distinctions as in the present instance. The subject is clearly one for an appeal to the reason and conscience of individuals, rather than for an attempt to lay down theoretical rules of conduct; but those who would guide their lives by principle, and who would not rush into marriage from the inferior motives alone, would do well to take it into serious consideration.

Among the determining causes of C. in large populations, the best ascertained are those connected with overcrowding and bad ventilation, especially when connected with all the depressing influences inherent in poverty, or associated with a reckless and abandoned life. It is certain that much might be done to improve the public health in this respect, by more attention on the part of the employers of labor to the comfort and habits of those who are, in more senses than one, their "hands" and the sources of their prosperity. A certain amount of improvement has, indeed, already been effected by the improved living of the working-classes during the last twenty years. Still it is well known, and proved by careful inquiries, that the workshops of tailors, printers, bakers, and other businesses carried on in close, ill-ventilated apartments, by large numbers of workmen, are, in a very aggravated sense, nurseries of consumption. Cotton and linen factories have also been shewn, when ill regulated, to be largely responsible for the death of their inmates from this disease. The finest regiments in the army were proved, some years ago, by evidence before a royal commission, to be decimated by this disease in time of peace to a frightful extent, in consequence, probably, of the bad ventilation and deficient comforts of the barracks. The cutlers and needle-grinders of Sheffield appear to owe their notoriously short lives to C., brought on by the inhalation of metallic particles in the close and stifling atmosphere of their workshops. The stone-hewers of Edinburgh and Glasgow, and the colliers of the Lothians, were some years ago in a similar predicament, from the inhalation, in the one case of stone-dust, in the other of lamp-smoke not sufficiently diluted with air. And even agricultural laborers, in many parts of the country, suffer from C. to an extent that is quite appalling, owing to the discomforts, and particularly the close and over-crowded condition of their dwellings. It is lamentable to think that such evils as these exist and that they might be to a great extent avoided; but this conclusion appears to follow legitimately from the evidence that has been adduced of the intimate connection of C. with overcrowding and a diminished supply of fresh air in workshops and dwellings. Some years ago. Dr Guy published the details of an inquiry into the health of the journeymen printers of London, from which it appeared, in the clearest manner, that the liability of these workmen to spitting of blood, and other well-known symptoms of C., was in exact proportion to the degree to which they had been subject to the evil influences of ill-ventilated workshops; and the marked improvement in the health of our prisons in the present day, has likewise been shewn to be to a considerable extent due to the diminished prevalence of C. among the inmates; which, again, is attributed, on good evidence, to the improved construction of the cells, and the increased facilities for wholesome exercise and occupation given to prisoners under confinement for lengthened periods. It has even been plausibly maintained, that in some of our modern jails C. is less prevalent than it is among the general population of the classes from which prisoners are chiefly taken; so that the fact of confinement, and the depressing influences of a penal discipline, are more than counterbalanced by the effect of a regular life, wholesome but plain food, and a sufficient amount of occupation to maintain mind and body

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in a sound state. Even admitting, therefore, that the causes of C. may be in part practically irremovable, there seems no reason to doubt that very much might be done to diminish its prevalence, as well as to arrest its course when already formed, by due attention to the comfort of the laboring population, both in their dwellings and in the pursuit of their daily occupations.

The general symptoms of C. are patent to every eye; the more accurate appreciation of them, however, and the use of the more strictly medical means for detecting the disease, and judging of its progress and probable issue, are among the more difficult of the duties of the physician. The disease often escapes attention in its early stages; yet not so much from the absolute difficulty of its detection, as from the insidiousness of its invasion, and the small alarm which its early symptoms excite in the mind of the sufferer, and even of his friends, when much occupied with the business of life, or when naturally not gifted with the faculty of refined observation. Whenever a young person appears to lose flesh and strength without known cause; when the color changes much from day to day, and from hour to hour; when shiverings are complained of, or even a sense of too great chilliness, alternated by flushings and an oppressive warmth, or too copious perspiration; when with these symptoms there is cough, however slight, or pains between the shoulders and about the shoulder-blades, or below the collar-bones; when there is an occasional tendency to spit up small quantities of blood from the chest, or when the patient is subject to repeated attacks of catarrh (q. v.), or when the bowels are habitually loose or very irregular, or when with any one of these symptoms in the female there is diminution or suppression of the usual periodic discharges, it is not too soon to apprehend the occurrence of C., and to place the patient under medical advice. In some instances the alarm may appear groundless, and health may rapidly return under appropriate treatment; but a far greater danger is that these symptoms, being overlooked or neglected, may prove only the precursors of a more apparently serious attack of disease, and that the first suspicion of C. may arise only after irreparable mischief has taken place. In general terms, it may be said that during the period of adolescence—i. e., before the body has assumed its full development in regard to strength and weight—no considerable check to its advance in these respects ought to pass unnoticed, more especially if attended with habitual feverishness, cough, or other symptoms of impaired health.

Attempts have been made to shew, that a peculiar habit of body or physical conformation, apart from disordered health, is to be regarded as predisposing to C.; and this has been called the phthisical diathesis (q. v.), but little or no dependence can be placed on any such indications, for this disease unquestionably occurs with nearly equal frequency in all the physiological varieties of the human race, when exposed to its exciting and predisposing causes. The experienced eye of the physician, however, will often discover the lurking germs of this insidious malady, even when active symptoms have been long absent, or have recurred after a long period of comparatively good health, by the effect of former disease upon the development of the frame in the period of childhood. For a similar reason, the use of the stethoscope (q. v.), and other means of minutely examining into the state of the chest, will sometimes detect a wholly unexpected attack of pulmonary C. in persons who supposed their lungs to be quite sound, or who have forgotten that they were ever subject to disease. As a rule, however, the symptoms mentioned above are pretty safe guides as to the commencement of C., if care be taken that their gradual progress does not cause them to be overlooked. In a few cases the disease begins otherwise, the form being that of an acute attack, such as fever or inflammation of the chest; but such cases are of course at once detected, as being serious enough to require medical advice.

The further medical history of C. is very complicated, and can hardly be treated of with advantage in a work like the present. Generally speaking, the progress of the disease is marked by the following symptoms: progressive emaciation, with habitual fever and frequent sweating at night; cough and pains in the chest, with expectoration of mucus, and, in the end, of purulent matter in large quantities; diarrhœa (q. v.), and sometimes obstinate vomiting, oftener failure of the appetite, with occasional sickness; gradually increasing weakness and indisposition for active exertion, often with more or less difficulty of breathing on exertion, but rarely with extreme distress or pain of any kind. This remarkable freedom from

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acute suffering is probably one reason of the self-deception usually attributed to consumptive persons, by which they are led to believe in their curability up to a very advanced state of the disorder.

The degree to which C. is curable has been a fruitful subject of discussion of late years. Properly speaking, there never has been any doubt that cases marked by all the symptoms of C. occasionally, and even pretty frequently in the early stages, get well; but it was argued that these were probably not genuine instances of what is now alone technically called C.—viz., tubercular disease. In France, where morbid anatomy was extensively cultivated in the beginning of the present century, the incurability of the tubercular form of C. was a general doctrine of the schools till the time of Laennec (q. v.), who, by multiplied instances, and careful observations on the dead body, shewed beyond all question the occasional arrest even of advanced C., and the frequent cure of it in the early stages. The appearances in the lungs, and other organs of persons affected with C., will be discussed under TUBERCLE.

The treatment of C. is a very complicated subject, and one much misunderstood, partly owing to the misrepresentations of quacks, and partly from the great demand for palliative remedies on the part of patients and their friends, tending to obscure the true principles of treatment even to the mind of the physician. It is, however, now well ascertained that the greater part of the cure consists in hygienic measures—i. e., the regulation of the mode of living, the occupation, the diet, the clothing, the food, the hours of repose, &c., of the consumptive—and all treatment by drugs is usually regarded by well-informed physicians as subordinate to that just mentioned. A life in the open air to a considerable extent, and in a climate which admits of the enjoyment of such a life even in winter, is the best restorative in cases of incipient C.; yet too much may be sacrificed to the desire of obtaining these advantages, if a genial climate is sought at the expense of the comforts of an English home, or with the effect of producing anxiety of mind or exhaustion of body by a long and fatiguing journey. Moreover, to many men a regular occupation is really a necessity in more senses than one; and to break up all the associations of habit in a person debilitated by disease, and not capable of seeking new sources of excitement, is to poison the springs of enjoyment, and render the remainder of life a burden. Many consumptives have been sent abroad only to die, and in all probability to die more miserably, and at an earlier period, than if they had remained at home. On the other hand, the favoring influences of climate are by no means to be rejected, when they can be obtained in accordance with the patient's previously formed habits, and with due regard to his means of occupation and prospects of eventual cure. A varied and wholesome, but light and unstimulating diet, including abundant dairy produce; flannel coverings next the skin, and clothing which is warm but not oppressive; a well-ventilated sleeping-apartment, with a moderate fire in cold weather; bathing in tepid water; the use of a respirator or of a light woollen covering for the mouth and nose in excessively cold weather; avoidance of late hours, crowded rooms, and every kind of dissipation; avoidance also of draughts of cold air, and of sitting in damp clothes or with damp feet; these are the principal circumstances to be kept in view in the ordinary regulation of the life of a consumptive patient. The use of cod-liver oil has been very popular of late years in the treatment of C.; but it may be reasonably doubted whether the reputation of this remedy be due to its powers as a medicine or simply as a fattening food. Occasional small opiates, and other medicines to arrest irritating cough and subdue feverishness, and in special cases the treatment proper to the complications, such as diarrhœa (q. v.) and breathlessness, are generally admitted as useful adjuncts to the means above mentioned; but they can hardly be discussed in this place with advantage, and should be in general used only under medical advice. See Ancell on Tuberculosis—on Phthisis (translated for the Sydenham Society).

Consumption in the Lower Animals.—C. rarely occurs in horses, the health-depressing influences which produce it in man and other animals inducing in them Glanders (q. v.) and Farcy (q. v.). It is also rare among dogs, but is common in oxen and sheep, and still more so in pigs. It is one of the chief causes of death amongst the apes and other denizens of our zoological gardens. It is produced, as in man, by overcrowding, damp lodging, bad food, neglected colds, and the like debilitating causes. It is notoriously hereditary; is frequently developed by breeding

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from parents nearly related to each other, and mostly affects animals of faulty conformation, prevailing, for example, amongst cows with small thin necks, narrow carcasses, hollow flanks, and dirty unhealthy-looking skins. Such animals are, moreover, subject to dyscntery; indeed, the two diseases depend, in cattle, on the same tuberculous or scrofulous state of system; they occur in the same stocks, and often replace each other in different generations. In all animals, the well-marked symptoms are very analogous. In cows, appetite and rumination become irregular; the coat stares, the skin is dry, and firmly adherent to the ribs; the animal is dull, loses flesh, is sometimes feverish, and if in milk, the secretion is diminished, blue, and poor; a tickling cough is easily excited; and diarrhœa is readily set up, and once established, is arrested with difficulty. As the disease advances, the lymphatic glands about the neck and elsewhere are enlarged; the fever, cough, and debility increase; the pulse is weak and quick; the excretions are fœtid; and purulent discharges trickle from the eyes and nostrils. C. in the lower animals is certainly curable, especially in the earlier stages. The treatment consists mainly in attention to regimen and diet, with careful protection from damp, cold, and other causes inimical to health. The food should be good, easily digested, and nourishing, and the capricious appetite coaxed by frequent variety. For cows, linseed or other convenient oleaginous articles should be freely used. Irregularity of the bowels may be remedied by an occasional dose of treacle, or by a small quantity of linseed or of castor oil; but active purgatives, and, indeed, all powerful and irritating drugs, must be avoided. A few simple tonics may sometimes be advisable. C. might be greatly limited by rejecting, for breeding purposes, all animals having any tuberculous taint, and by greater attention to the feeding, shelter, and warmth of young stock. Neglect of these latter precautions is the cause of its unusual prevalence amongst the young cattle of the more exposed parts of our eastern coast. Its connection with overcrowding and faulty sanitary arrangements, is evident from its frequent occurrence amongst the cows that have for several months been inmates of our badly-managed town-dairies.

CONSUMPTION, in Political Economy, is the converse of Production (q. v.). The word is of very frequent use by political economists, but is has never had a definite meaning attached to it. It may be generally said, that everything which is produced or made by human labor is to be consumed, or to cease in its turn to exist. But there is not only a great difference in the rate at which things are consumed—some going rapidly, while others last for centuries—but there is a C. which is annihilation or loss, and a C. which is in reality gain, or an addition to the wealth of the world. Food is an article of production destined to be immediately consumed, but the food of the working-men sustains him while he is producing more than he consumes. A thousand pounds spent in improving a thousand acres of land, or in building a house, produce something which lasts for many years ere it is consumed or rendered valueless. The same sum spent in raising a wheat crop will seem to be immediately consumed, but it may have in reality been laid out more beneficially than the other, through the process of reproduction. If the thousand pounds laid out on land increases the value of that land so as to make it worth eleven hundred pounds, while the wheat raised by the expenditure of the other thousand is sold for fifteen hundred pounds, there is less C. in the latter expenditure than the former. If the thousand pounds, on the other hand, be expended on squibs and sky-rockets, the C. is greater still. The makers of the squibs and sky-rockets no doubt live, but it would tend less to C. if they lived by making something that would last.

CONTACT. In the Geometry, two lines, one of which at least is curved, are said to be in C. when they have a common point from which they recede, in such a way that the deflection of the one from the other will, if a sufficiently small departure be taken, become as small a fraction as we please of that departure. A complete discussion of the nature and order of C. can be obtained only by means of the differential calculus.

CONTA'GION, the communication of a disease from the sick to the healthy, either by direct contact of a part affected with the disease, or through the medium of the excretions and exhalations of the body. Some authorities have employed the term infection (q. v.) to designate this latter method of communication, and have correspondingly limited the meaning of the word C.; but no practical end is

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served by this refinement, and it has indeed led to great confusion by obscuring the fact of the communication, which is, when clearly proved by instances, the most important element in the inquiry. If of a given number of healthy persons exposed to association with the sick, a much larger proportion becomes ill than can be reasonably accounted for on general principles, or than is actually observed among persons of similar habits not exposed to this cause of disease, the disease is said to be propagated by C.; and if the characters of the disease are well marked, and nearly similar throughout the group of cases, it is said to be due to a specific C., which may be in some cases shewn to be capable of reproducing the primary disease to an illimitable extent, being conveyed (as in the case of syphilis, q. v.), either through the liquid secretions of the affected part, or (as in the case of small-pox) in this way, and also through the aërial exhalations. Contagious diseases are generally epidemic (q. v.) in their mode of propagation, attacking large numbers of people at once, and travelling from place to place. But some epidemics are not contagious, as Influenza (q. v.).

CONTAGIOUS DISEASES (Women) Acts were passed in 1865, 1867, and 1868 for the seaport and military towns, Aldershot, Canterbury, Chatham, Colchester, Dover, Gravesend, Maidstone, Plymouth and Devonport, Portsmouth, Sheerness, Shorncliffe, Southampton, Winchester, Windsor, and Woolwich; and in Ireland, the Curragh, Cork, and Queenstown. The policy of these Acts has since been keenly canvassed, one party denouncing them as demoralising and degrading, the other party defending them on purely sanitary grounds. They authorise a justice of the peace, on the sworn information of a superintendent of police that a woman within the above area is a common prostitute suffering from venereal disease, to cause her to be examined, and if necessary detained in an hospital. She is, however, first entitled to notice, so that she may submit voluntarily to examination. The limit of detention in hospital is three months to nine months. She may be convicted for refusing to attend for examination, and imprisoned for one month; and for a second offence, three months. If she considers herself cured, she can demand to be taken before a justice, who, on reasonable evidence, can discharge her. Occupiers of houses are liable to a penalty for permitting a woman uncured to resort to or to be in their houses. The justice hears the case in private; but if the woman demands it, he must hear her in open court.

CONTARI'NI, the name of a noble family in Venice, one of the twelve that elected the first doge. Between 1041 and 1674, seven Doges were furnished by this family, and several of its members were men of note. AMBROGIO C. was sent as ambassador from Venice to Persia, 1473—1477, and gave an account of his travels in his "Viaggi fatti da Vinetia, alla Tana, in Persia, in India, et in Constantinopoli" (Ven. 1487).—CARDINAL GASPARO C. distinguished himself as Venetian ambassador at the court of Charles V., and was papal legate at the diet of Ratisbon, 1541, where he displayed great moderation.—GIOVANNI C., born 1549, was one of the most famous painters of his time; he painted the Resurrection, in San Francisco di Paolo's, in Venice.—VINCENZO C., born 1577, had acquired, at the age of 26, such a fame for learning, that the magistrates of Padua, in order to secure him for their university, established an extraordinary professorship of Greek and Latin eloquence.

CONTE'MPT, against the crown's ecclesiastical supremacy, by assuming local ecclesiastical titles under the authority of the court of Rome, is forbidden under penalties by 10 Geo. IV. c. 7, s. 24, and by 14 and 15 Vict. c. 60.

CONTEMPT, against the sovereign's title. See PRÆMUNIRE.

CONTEMPT OF COURT. There is probably no country in which courts of law are not furnished with the means of vindicating their authority and preserving their dignity by calling in the aid of the executive, in certain circumstances, without the formalities usually attending a trial and sentence. Of this the simplest instance is where a judge orders the police to enforce silence, or to clear the court. Contempts by resisting the process of a court, are in England punished by Attachment (q. v.); contempts done in the face of the court, by directly obstructing its proceedings, may be visited with commitment and fine. Striking a supreme judge in the discharge of his duty, or even threatening him by drawing a weapon, or the like, has been an offence at common law in England of the highest kind since the times

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of the Anglo Saxons; and in Scotland it is a statutory offence, punishable either capitally or by very severe arbitrary pains (1593, c. 173; 1600. c. 4). See JUDGE. In the latter country, minor contempts are punishable arbitrarily, either *ex proprio motu* of the court, where the offence has come under its immediate observation, or by a summary complaint at the instance of the public prosecutor, where, though not committed in the immediate presence of the court, it has relation to a matter which is, or has been recently, in dependence before it.

CONTEMPT OF PARLIAMENT. See PARLIAMENT.

CONTI, House of, a branch of the House of Condé (q. v.). Armand de Bourbon, first prince of C., and brother of the great Condé, was born at Paris in 1629. He took his title from the little town of Conti, situated five leagues from Amiens. Of a feeble constitution and deformed shape, he was early destined for the church, but the fame of his brother inspired him with military ardor. He commenced his martial career as the opponent of his brother, but soon entered into alliance with him. After 1657, he retired from the world, and gave himself up, without reserve, to devotion. He died at Pezenas in 1666.—LOUIS ARMAND, Prince de Conti, Conte de Pezenas, and peer of France, eldest son of the preceding, was born in 1661. After a short career in arms, he died of small-pox at Fontainebleau, 5th November 1685. He left no children, and was succeeded by his brother FRANÇOIS LOUIS, Prince de la Roche-sur-Yon et de Conti, who was born at Paris in 1664. This was the most remarkable member of the family. Educated under the eyes of the great Condé, he early conceived a passion for bearing arms. His first campaign was made in Hungary, where he distinguished himself; but having fallen into disgrace with the court, he was banished to Chantilly, with strict orders not to leave it. The great Condé, before his death, persuaded Louis XIV. to pardon him. Subsequently, C. served under the Duc de Luxembourg, who was warmly attached to him, and took a brilliant part in the victories of Steinkirk and Neerwinden. In 1697, he narrowly escaped being made king of Poland. On his return to France, he was still coldly received by Louis, who, however, was at last forced by disaster to employ him. He received the command of the army of Flanders in 1709, but died on the 22d February of the same year. Massillon pronounced his funeral oration. Saint-Simon, in his celebrated "Mémoires," thus speaks of him: "He was the delight of armies, the divinity of the people, the hero of officers, the darling of parliament, and the admiration of the most learned savans."—The last member of the House of C. was LOUIS FRANÇOIS JOSEPH, born 1734, died in Spain 1807.

CONTINENT. Though no mathematical distinction has ever been drawn between a C. and an island, the usage of language has generally recognised five great masses or divisions of land as continents—Europe, Asia, Africa, America, and Australia. Europe, Asia, and Africa form properly one great C., the only one known to the ancients; the second was discovered by Columbus; and the third made its appearance at the antipodes of Europe in the beginning of the 17th century. The existence of an antarctic C. has not yet been satisfactorily established. The apparent irregularity in the shape of the continents disappears on nearer examination, and certain uniformities become apparent, the causes of which have long been subjects of speculation. Bacon remarked, that the continents were pointed towards the south polar sea, and presented broad conformations toward the north. J. R. Forster followed up this remark by the generalisation, that these southern points are the ends of mountain-ranges, which are continued northwards; and that at the east side of these promontories there are always larger or smaller archipelagoes of islands, while the west side of the continents is indented with large bays.

Not only have attempts been made to reduce the horizontal outlines of the continents to rule, but their vertical dimensions have been examined with the same view. Observation had been confined to ascertaining the heights of individual summits, until Alexander von Humboldt enriched physical geography with a new numerical element, by endeavoring to determine the mean height of continents—i. e., the elevation of the centre of gravity of their mass. He estimated the mean height of Europe at 103 toises (a toise is about 6 feet 6 inches), of North America at 117, of South America at 177, and of Asia at 180 toises. Laplace had calculated the mean height of all the continents at 1000 metres; Humboldt found this too great by two-thirds, and gives

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the height of the centre of gravity of all the continents, except Africa, above the sea-level at 307 metres, or 1007 feet.

CONTINE'NTAL SYSTEM; Berlin Decree; Orders in Council. The C. S. was the name given to Napoleon's plan for shutting England out from all connection with the continent of Europe, and thus compelling her at least to acknowledge the maritime law established at the peace of Utrecht. See NEUTRALITY. This system began with Napoleon's famous "Berlin Decree" of November 21, 1806, which declared the British islands in a state of blockade, and prohibited all commerce and correspondence with them; every Englishman found in a country occupied by French troops or by their allies was declared a prisoner of war; all merchandise belonging to an Englishman, lawful prize; and all trade in English goods entirely prohibited. No ship coming direct from England, or from a British colony, was allowed to enter any port; and any ship seeking by false declarations to evade the regulation, was confiscated with its cargo as if British property.

England was not long in making reprisals. By an "order in council," issued January 7, 1807, all neutral vessels were prohibited from entering any port belonging to France or her allies, or under her control. Every neutral vessel violating this order was to be confiscated with its cargo. Still more oppressive for neutral commerce was a second order in council of November 11, 1807, by which all harbors and places of France, and her allies in Europe and the colonies, as well as of every country with which England was at war, and from which the English flag was excluded, were placed under the same restrictions as if strictly blockaded. There orders were followed by reprisals on the French side. By the Milan Decree of December 17, 1807, strengthened by a second of January 11, 1808, from the Tuileries, any vessel, of whatever nation, that had been searched by an English ship, had submitted to be sent on a voyage to England, or paid any duty to the English government, was to be declared *denationalised*, and treated as English. In order the more effectually to annihilate English commerce, there appeared, August 5, 1810, the tariff of Trianon for colonial goods; this was extended by a decree of 19th September, and on the 18th October followed the Decree of Fontainbleau, ordering the burning of all English goods; an order which was to be carried out with more or less modification in all countries connected with France.

The consequence of the C. S. was undoubtedly the springing up on the continent of many branches of manufacture to the prejudice of England; on the other hand, the price of foreign produce rose to an extraordinary height on the continent, enabling a few commercial men to make fortunes, but sensibly affecting the daily comfort of the middle classes. This violent interruption of human intercourse and sociability was an unnatural condition, which could not last long, and could only serve to strengthen the hatred of Europe against French tyranny. Accordingly, with the breaking up of Napoleon's power, the C. S. fell to the ground.

CONTI'NGENCY, in Law, an event, the occurrence of which, though uncertain, is sufficiently probable to be provided for. Thus, contingent debts, by the law of Scotland, are taken into account in estimating the claims on the estate of a bankrupt, though a contingent creditor is not entitled to concur in a petition for sequestration, or to vote in the election of a trustee, until his claim shall be valued.

CONT'INGENT is the quota of troops furnished to the common army by each member of an alliance or confederation of states. The word was especially applied to the proportions contributed by the several German states to the army of the confederation, which has given place to the empire. See GERMANY.

CONTI'NUED FRACTIONS. See FRACTIONS.

CONTO'RNIATE (Ital. *contorno*, Fr. *contour*) a term applied to a class of antique medals, which have a deep line cut round the edge, like a furrow.

CONTO'RTED STRATA are beds which are bent and twisted, so that in a section their edges would be seen to follow crooked and curved lines, often doubling back and running altogether out of their former course. An account of extensive C. S. will be found under the article APPALACHIANS.

CO'NTRA, a term in Music, meaning opposite, lower, and applied to the alto and tenor parts when they form the lowest part in the harmony. When a part lower than the usual bass is employed, it is called contra-basso. C. is also used in

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organ-building, to indicate that a certain stop, or register of pipes, is an octave lower than the usual pitch.

CONTRA BASS, or Violo'ne, the largest species of stringed instrument, commonly called the double bass. In Britain, this class of instrument has three strings, the lowest being A, a minor third below the low C of the violoncello; the next is a fourth above, viz., D; and the highest is G, a fourth above D. This manner of stringing is defective, as all the great masters have written for the C. B. down to E, for which reason the German instruments have all four strings, the lowest a fourth below our low A. C. B. is also the name of an organ stop of 16 feet pitch.

CO'NTRABAND OF WAR (Lat. *contra bannum*, against the proclamation), is a name applied to certain commodities, or the rules relating to them, during hostilities between states which acknowledge what are called the laws of nations. One such law is, that neutral nations must not carry on, for the advantage of either of the belligerent powers, any branches of commerce from which they are excluded in time of peace. Another is that the name of C. of W. shall be given to such articles as pertain to military or naval warfare—guns, ammunition, and stores of all kinds. Unless there are special treaties, defining exactly what articles are C. of W., the interpretation of this law often leads to much embarrassment. Another law insisted on by England during the last great war was, that each belligerent shall have a right to visit and examine neutral ships, to see whether they carry any articles which are C. of W., and which seem likely to be intended for the enemy. A neutral state may carry on ordinary trade with either belligerent, except when prevented by blockade (see BLOCKADE); but the ships, according to the above rules, must not contain articles C. of W.; nor must a conterminous land frontier be crossed by such commodities. If a merchant evades these rules, he does so at his own risk; his merchandise may be seized, and his own government will not protect him. By the law and practice of nations, it is for the Admiralty Court of the capturing power to decide what is or what is not contraband of war. Upon such questions it is the province of this tribunal to adjudicate; and from its final judgment there is no appeal. At various times, discussions have arisen whether corn, hay, or coal, can ever be included in the list of articles C. of W.; they are obviously articles of peaceful commerce, but they are also essential to the maintenance of an army, and sometimes a supply would give one belligerent a great advantage over the other. Especially is this the case in reference to coal, in the present age of war-steamers.—Contraband in commerce depends upon the special laws of each country. See SMUGGLING.

CO'NTRACT. For a statement of the principles on which contracts in general are founded, see CONSENT.

CONTRA'CTIONS. The wish or necessity of economising labor and parchment, led the scribes of the middle ages to use a great many abbreviations or C. in their manuscripts. These C. were transplanted into the first printed books; and more recently they have been reproduced in many works, as well in this country as on the continent, where it was thought desirable that the modern print should represent as nearly as possible all the peculiarities of the ancient manuscript. A knowledge of C., therefore, is indispensable not only to readers of old writings, but to readers of the printed books of the 15th, the 16th, and the earlier part of the 17th centuries, and to all who desire to avail themselves of the vast stores of historical and archæological materials accumulated in the rolls and records published by the governments of Great Britain, France, and other countries.

C. may be divided into six classes; 1. C., properly so called; 2. C. by elision or suspension; 3. C. by writing a smaller letter above the word contracted; 4. C. by running two or more letters into one character; 5. C. by symbols representing syllables or words; 6. C. by initial letters.

1. *Of C., properly so called*, there are three great kinds: (I.) A straight line over a letter denotes the omission of an *m* or an *n* after it. (II). A crooked or circumflex line over or through a letter signifies that one or more letters are omitted after it—occasionally both before and after it—(III.) The sign ꝛ over a letter shews that *er*—or occasionally *re*—is omitted after it.

2. *In C. by elision or suspension*, the word is not fully written, the want of the ter-

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minating letters being denoted by the marks ℘, or ', or.; thus: ase ℘, *assisa*; test', *teste*; dat. *datum*; temp. *tempore*.

3. *C. By writing a smaller letter above the word contracted.*—If the letter so written be a vowel, it denotes the omission of a consonant; if a consonant, the omission of a vowel. Occasionally the omission extends to two or more letters, whether vowels or consonants.

4. *Of C. by running two or more letters into one character*, the diphthongs æ and œ, and the sign & for *et* are familiar examples.

5. *C. by symbols representing syllables or words.*—

6. *Of the more common C. by initials*, a list has already been given in this work under Abbreviations (q. v.) In this way of writing, a whole sentence may be expressed without so much as one word being written at length, as in the well-known epistolary form S.V.B.E.E.Q.V.; that is, *Si vales, bene est, ego quidem valeo*. Among the initials used in old writings and books, it will suffice here to mention the following:

A.	Alexander, Alanus, Arthurus.
B.	Benedictus, Bernardus, Bonifacius.
B.M.V.	Beata Maria Virgo.
B.P.	Beatus Paulus, *or* Petrus.
B.V.	Bene vale.
C.TT.	Cardinalis Tituli.
D.	David, Durandus, Duncanus.
D.N.PP.	Dominus Noster Papa.
E.R.	Ecclesia Romana.
F.F.F.	Fiat, Fiat, Fiat.
G.	Gulielmus, Gilbertus, Guido, Georgius.
G.G.	Gregorius.
I.C. or I.X.	Jesus Christus.
I.D.N.	In Dei Nomine.
J.	Johannes, Jacobus, Julietta, Josephus.
M.	Malcolmus, Martinus, Matilda, Maria.
N.E.R.	Notarius Ecclesiæ Romanæ.
O.S.B.	Ordinis Sancti Benedicti.
P.S.R.I.	Princeps Sacri Romani Imperii.
R.	Robertus, Rolandus, Ricardus.
R.P.D.	Reverendissime Pater Domine.
S.	Symon, Samuel, Siwardus.
S.C.M.	Sacra Cæsarea Majestas.
S.D.	Salutem Dicit.
S.D.N.R.	Supremus Dominus Noster Rex.
S.M.E.	Sancta Mater Ecclesia.
S.P.	Sacri Palatii.
S.R.E.	Sacra Romana Ecclesia.
S.V.	Sanctitas Vestra.
T.	Thomas, Turgodus, Thoraldus.
V.R.P.	Vestra Reverendissima Paternitas.
V.S.	Vestræ Sanctitatis.
W.	Willelmus, Walterus, Wido.

Doubling an initial shews that it is to be taken in the plural sense, as PP. for Papæ, TT. for Tituli, MSS. for Manuscripts.

C. Corrupted.—The Anglo-Saxon denoting *th* has been corrupted into *y*; whence ye is put for *the*, yt for *their*, yn for *then*.

Collections of C. have been engraved in *fac-simile* in several works, among which may be enumerated Baring's "Clavis Diplomatica," Hanov. 1737 and 1754; Anderson's "Diplomata Scotiæ," Edin. 1739; Walther's "Lexicon Diplomaticum," Gotting, 1745; the "Nouveau Traité de Diplomatique," Paris, 1750—1765, one of the many noble works of the Benedictines of St. Maur; Lemoine's "Diplomatique Practique," Metz, 1765: Trombelli's "L'Arte di conoscere leta de' codici Latini ed Italiani," Bologn. 1756 and 1778; M. Nat. de Wailly's "Eléments de Paléographie," Paris, 1838; M. L. Alph. Chassant's "Paléographie," Paris, 1839 and 1854, and his "Dictionnaire des Abréviations," Evreux, 1846.

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CONTRAVE'NTION, in the law of Scotland, any act done in violation of a legal condition or obligation. The term is most frequently applied: 1. To an act done by an heir of entail, in opposition to the provisions of the deed; 2. To an act of violence or molestation, in opposition to Lawburrows (q. v.). Stair, i. 9, s. 30, and iv. 48.

CONTRAYE'RVA, a medicine once in much repute against low fevers, and as a mild stimulant and diaphoretic, and still used in some countries, although not much in Britain, consists of the root-stocks (rhizomes) of different species of *Dorstenia*, a tropical American plant of the natural order *Moraceæ*. The genus is remarkable for the plane receptacle in which the numerous small flowers are fixed; the male flowers in superficial depressions, the female flowers in deep sockets. The flowers have neither calyx nor corolla. The fruit consists of *achenia*, imbedded in the fleshy receptacle from which they are projected by elastic force when ripe. *D. Contrayerva* is a perennial plant, with palmate leaves, and somewhat quadrangular receptacles. Its root-stock is knotty, 1—2 inches long, about half an inch thick, reddish-brown, pale within, sending out on all sides many slender fibres (roots), which are generally loaded with small brown knots. It has a peculiar aromatic, overpowering smell, and a somewhat astringent, warm, bitterish taste. It keeps badly. It contains so much mucilage, that a decoction of it will not pass through a filter.—*D. Braziliensis*, a stemless species, with oblong, heart shaped leaves and a circular receptacle, a native of the West Indies and Brazil, possesses similar properties, but is said to be more energetic, and furnishes the C. of British commerce. Other species possess similar properties. They have been also represented as efficacious against serpent-bites, and hence the name C., a *counter-poison*.

CON'TUMACY, a Scotch law-term, in one sense, equivalent to non-appearance in England (see DECREE IN ABSENCE; DEFAULT); but sometimes used in the wider sense of disobedience to a judicial order. In a criminal process, C. is punished by a sentence of fugitation; in a civil process, its only consequence is that the case will be proceeded with, and decree pronounced against the contumacious defender.

CONVALE'SCENT HOSPITALS, although as yet rare in this country, are institutions of the greatest importance. All who are acquainted with our ordinary hospitals, which are often situated in crowded parts of populous cities, must feel that a very considerable number of patients must almost of necessity die soon after returning to their own unhealthy homes, simply for want of an institution where convalescence may be developed into perfect health, under the general influences of pure air, gentle exercise, and a nourishing and well-regulated diet. The convalescent hospital must be regarded as a stage in the process of cure intermediate between the ordinary hospital and the patient's home: it is an equally necessary addition both to civil and military hospitals. One of the greatest of our military surgeons, Robert Jackson, writing in 1803, recommends "separate and detached houses," and the removal of convalescents "to other apartments or hospitals." He states his firm conviction, as based on long and most extensive experience, that soldiers, in a state of convalescence, recover their health better and sooner in sheds, huts, and barns, exposed occasionally to wind and rain, than in the most superb hospitals in Europe. "Pure air," he adds, "in this respect, is alone superior to all forms of cure, and to all other remedies without such aid." The same great authority frequently notices relapse as being the leading cause of mortality in general hospitals.

The magnificent establishment at Vincennes, founded in 1857 by the late Emperor of the French, may be taken as a type of what convalescent hospitals ought to be. We borrow the details from Sir James R. Martin's article on "Convalescent Hospitals" in Holmes's "System of Surgery." It is composed of a main building, with two long wings, two stories high, with a ground floor, and contains more than 400 beds. It contains a chapel, airy dining-halls with marble tables and convenient seats, a library, and play-rooms; the wings in both stories being subdivided into rooms, each containing three beds, and looking towards the south. Each patient has the use of a press, with lock and key. There is ample garden-ground attached to the building. The mean duration of residence is 22 days, the patient remaining till he is either completely cured, or declared incurable. The diet is regulated by the director and head physician, and usually consists of soup at 7.30 A. M.; meat and vegetables at 10.30 A. M.; soup, roast meat, vegetables, and salad or dessert at 5 P. M.;

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each convalescent receiving a pint of Burgundy, and as much bread as he may choose. Numerous means of diversion, as skittles, balls, draughts, dominoes, &c., are afforded, but cards are prohibited; and the library, the greater part of which has been presented by Paris booksellers, is much resorted to, there being on an average fifty readers. The conduct of the inmates is exemplary. They are allowed to see their friends thrice a week. The officers are: a director, treasurer, head physician, and three house-surgeons; six nurses, a chaplain, five clerks, a store-keeper, four overseers, and forty subalterns. The simple fact, that this hospital, in less than three years, administered relief to 14,000 convalescent artisans, affords undoubted evidence, were such evidence required, of the utility of such institutions. Several establishments of the kind are already in operation in England. One, for 50 to 60 patients, was erected in 1867 near Edinburgh; and a large one has recently been built at Lenzie junction, near Glasgow.

CONVALLA'RIA. See LILY OF THE VALLEY.

CO'NVENT. See MONASTERY.

CONVE'NTICLE (Lat. *conventiculum*, a diminutive of *conventus*), originally meant a cabal among the monks of a monastery, formed to secure the election of a favorite as abbot. The word consequently fell into disrepute. It was first given as an appellation of reproach to the assemblies of Wickliffe's followers, and was afterwards applied to the meetings of the English and Scottish nonconformists. Severe statutes were often passed for the suppression of these conventicles. See ACT OF TOLERATION, TEST ACTS.

CONVE'NTION, National. See NATIONAL CONVENTION.

CONVENTION OF ROYAL BURGHS, in Scotland. The burgh system of Scotland is very ancient (see BURGH), but it was by stat. 1487, c. 111, that the royal burghs of Scotland were first ordered to hold an annual meeting by commissioners, at what is now the unimportant town of Inverkeithing, where "the welfare of merchandise, the gude rule and statutes for the common profit of burrows," should be discussed, "and which should provide for remeid upon the skaith and injuries sustained within the burrows." This convention is conjectured by Mr Burton to have taken the place of the more ancient "court of the four burghs"—Edinburgh, Stirling, Berwick, and Roxburgh. The powers conferred by this act, which were renewed by later statutes, are still in force, and in virtue of them the C. of R. B. meets annually in Edinburgh on the second Tuesday of July. This court had a partial jurisdiction in questions as to the general regulation of trade, along with legislative authority over the constitutions of the burghs, which, previously to the passing of the Burgh Reform Act, included a right to adjust their "Setts" (q. v.). Its operations are now almost entirely limited to discussing measures connected with trade, for which it may be proposed to apply to parliament. In this respect, it acts in the character of something like a general chamber of commerce (q. v.).

CONVENTION PARLIAMENT. It is a branch of the royal prerogative, that no parliament shall be convened by its own authority or by any other authority than that of the sovereign. Where the crown is in abeyance this prerogative cannot of course be exercised, and the expedient of Convention Parliaments has been resorted to, the enactments of which shall afterwards be ratified by a parliament summoned in accordance with the provisions of the constitution. The C. P. which restored Charles II. to the throne met above a month before his return, and was afterwards declared to be a good parliament, notwithstanding the defect of the king's writs (13 Car. II. c. 7 and c. 14). In like manner at the revolution of 1688, the Lords and Commons, on the summons of the Prince of Orange, met in Convention and disposed of the crown and kingdom, and this convention was subsequently declared (1 Will. and Mary, st. 1, c. 1) to be really the two Houses of Parliament, notwithstanding the want of writs and other defects of form. Under the name of CONVENTION, there also took place a meeting of the Estates of Scotland, called by the Prince of Orange on the same occasion. This meeting commenced on the 14th of March, 1689, and was turned into a parliament on the 5th of June thereafter. The principal act of the Convention was to settle the Scottish crown upon William and Mary. After these precedents, we are perhaps almost entitled to regard the meeting of a C. P. as the constitutional mode in which the general will of England expresses it-

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self on such questions as cannot be constitutionally discussed in parliament—e. g., a change of the reigning dynasty.

CONVE'NTIONAL, in Art, is that which is in accordance, not with the absolute principles of beauty in form and color, but with the opinions and sentiments with reference to forms and colors, which chance to prevail at a particular time, in a particular country, or social class. Conventionality in art holds the same relation to the beautiful that conventionality in morals does to the good, or in speculative opinion to the true.

CO'NVERGING, or Convergent, is applied, in Geometry, to straight lines that meet or tend to meet in a point; looked at in a direction from the point, they are *divergent*, or separating. C. and divergent are often used in reference to rays of light. See CATOPTRICS. In Algebra, the term convergent is applied, in a loose way, to any infinite series the terms of which go on diminishing; while a series is called divergent when its terms continually increase. Strictly, however, a C. series is one whose terms diminish in such a way that no number of them added together will be as great as a certain given number. Thus, however far we extend the series, $1+\frac{1}{2}+\frac{1}{4}+\frac{1}{8}$. &c., the sum will never amount to 2, though always approaching nearer to it. But the series, $1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+$, &c., has no such limit, and is therefore not convergent in this sense.

CONVERSA'NO, a town of South Italy, in the province of Bari, about 19 miles south-east of the city of that name. It is pleasantly situated on a hill in a fertile wine, oil, almond, and cotton producing district. It has a cathedral and several convents. Pop. about 10,500.

CO'NVERSE AND CONVERSION are terms in Logic, signifying that one proposition is formed from another by interchanging the subject and predicate: as, "Every A is B;" the C. of which is, "Every B is A." This example is termed a case of *simple* conversion; besides which, however, logicians recognise two other kinds of conversion—viz., *limited* conversion, and conversion by *contraposition*. The former may be exemplified thus: "Every A is B;" the limited C. of which is, "*Some* Bs are As;" and the latter thus: "Some A is not B;" which, converted by contraposition, is "Something that is not B is A;" "Some men are not wise; some beings that are not wise are men." Of these logical converses, the second and third are *necessarily* true, but not the first. When we say, "Every A is B." the reader might at first sight conclude that "Every B is A" also; but if, instead of these letters, to which he probably attaches no meaning, he employ terms denoting objects with which he is familiar, he will see that a simple C. may be very far from the truth. Thus, "Every penny is a coin," has for its simple C. "Every coin is a penny." The reason why a simple C. is not necessarily true is, that in such a propoeition as "Every A is B," the subject "A" is—to speak logically—universally distributed, whereas the predicate "B" is not. If it were, the proposition would read as follows: "Every A is *every* B;" the simple C. of which, "Every B is every A," would be true.

CO'NVEX. See CONCAVE.

CONVEY'ANCE, in Law, is the deed or writing by which property is conveyed or transferred from one person to another. The term, though strictly applicable, is not generally applied to the act of transferring personal, or, as it is called in Scotland, movable property. As regards real or heritable property, the more special nature of a C., and the consequent duties of the conveyancer, in so far as they fall within the scope of this work, will be explained under separate heads. See, for England, FEE, FREEHOLD, COPYHOLD, LEASEHOLD, MORTGAGE, CHATTELS, BILL OF SALE, ASSIGNMENT, FEOFFMENT, DEED, COMMON FORMS, GRANT, TRUST, SETTLEMENT, USAGES, &c.; and for Scotland, FEU, SUPERIOR, VASSAL, WARD-HOLDING, MORTIFICATION, BLANCH-HOLDING, BURGAGE-HOLDING, CHARTER, SASINE, DISPOSITION. A statement of the general nature of a C., and of the feudal system, with which the conveyancing of many of the countries of Europe is still so intimately connected, will be given under CONVEYANCING.

CONVEY'ANCER is a person who practices the art of preparing the deeds or writings used for the conveyance or transference of property from one person to another. Conveyancers in England are generally barristers, who in most instances

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belong to the Equity bar. There is also a special class of practitioners, known by the name of conveyancers, who are members of the Inns of Court, though not called to the bar. These must take out an annual certificate. But although most deeds respecting real estate are drawn by conveyancers, they are also the ordinary work of an attorney or solicitor, and may be drawn indeed by any party, if he chooses to take the risk.

CONVEY'ANCING is the art of preparing the deeds or instruments used for the transference of property from one person to another. Such writings form the title or evidence of the right of the person possessing or claiming possession of property; and it is of the greatest importance that the conveyancer employed to prepare them, should be possessed of a competent knowledge of the law as applicable to such deeds, and have the skill required to frame them in such a form as clearly to express and attain the object intended. In the earliest state of society, there was no call for the profession of a conveyancer; property was held in right of occupancy, without any written title, and was also conveyed from one to another without writing, the new owner being usually put in possession in presence of witnesses called for the purpose, by some symbolical form, such as the delivery of earth and stone to represent the land, a wand to represent wood, grass and corn to represent tithes, and other appropriate symbols to represent mills, fishings, or other kinds of property.

In the earlier period of the history of the Jews, the symbolical mode of changing the ownership of property was curious. "Now this was the manner *in former time* in Israel concerning redeeming and concerning changing, for to confirm all things: a man plucked off his shoe, and gave it to his neighbor: and this was a testimony in Israel" (Ruth iv. 7). In later times, the Jews appear to have a much more artistic system of C., making use of all the safeguards that are used in modern times—viz., writing, witnesses, subscribing, sealing, and recording the documents. There is a very distinct account of a Jewish conveyance in the later period in Jeremiah xxxii 9—12: "And I bought the field of Hanameel, and weighed him the money. And I subscribed the evidence, and sealed it, and took witnesses. So I took the evidence of the purchase, both that which was sealed according to the law and custom, and that which was open: and I gave the evidence of the purchase unto Baruch, in the sight of Hanameel [the seller], and in the presence of the witnesses that subscribed the book of the purchase, before all the Jews that sat in the court of the prison."

The Romans made no distinction in principle between real and personal or movable and immovable property, in their conveyancing. Each kind of property was held free of any superior. Their deeds were therefore simple, not requiring any reservation or declaration of the superior's rights. They had public registers in which conveyances were recorded. After the invasion of the southern by the northern nations, the feudal system spread over nearly the whole of Europe, and C. was regulated in accordance with it; the rights of the superior and the rights of the vassal or proprietor being carefully distinguished. The Leges Barbarorum, contained in the Burgundian Code, and the Code of the Longobardi, embody the older feudal uses, from which the modern are derived. In the 7th c., a work of peculiar interest to the conveyancer was compiled by Marculfus, a monk, containing the germs of modern conveyancing. It is, in substance, a book of styles or forms of deeds, partly Roman and partly feudal. The genius of the system of land-rights derived from the barbarians was to concentrate the property of land, for the sake of individual power; while the Roman laws and customs tended in the opposite directions, for they treated land in regard to succession like movables, as the French now do, dividing it among the whole members of a family. Alienation by sale or gift was freely permitted, a power long denied by the feudal rules. Indeed, feus or grants were originally revocable by the superior, and did not become hereditary till the time of Charlemagne.

Among the ancient Goths and Swedes, the conveyance of land was made in the presence of witnesses, who extended the cloak of the buyer, while the seller threw a clod of the land into it, as a symbol of the transference of possession. Among the Saxons, the delivery of a turf by the seller to the buyer was necessary. Written titles were, however, introduced at an early period, and at first were short and simple in form, but increased in length and complexity as civilization advanced, con-

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taining various conditions, provisions, and limitations, so that the art of the conveyancer became both a difficult and laborious one. He had not only to prepare the appropriate form of conveyance, but to examine the prior writings forming the title to the property, in order to judge whether they were in proper form and valid. As a general rule a written title is now essential to the possession of real property in civilized communities; and if there is no written title the property falls to the crown or state. In the Roman empire, extending over the greater part of Europe, the system of land-rights was allodial—that is, the lands were held independent of any superior. After the irruption of the northern nations into Italy, the feudal system was introduced, by which the proprietor has only a limited right under a superior. The introduction of the feudal system tended to complicate written titles to land very much, as not only had the rights of the grantee or vassal to be expressed and defined, but those of the granter as overlord or superior, also. In the present century, again, the tendency is towards simplicity; and in France, the feudal system has been superceded by the Code Napoleon. In Great Britain and other countries still retaining the feudal system, the forms of C. have been much shortened and simplified. While the fendal system, on the one hand, increased the complexity of C., it ought not to be forgotten that, on the other hand, it greatly lessened the number of conveyances. Under the Roman law, real property descended equally to all the heirs of a deceased proprietor, each heir requiring a written title to his own share; while the genius of the feudal law was to concentrate property in the heads of families, and the eldest son inherited the whole real estate of his ancestor: and alienation, by gift or sale, was long denied to feudal proprietors. Improvement in the science of law occasions improvement in conveyancing. Under the Roman empire, the art of C. had attained to much precision in the hands of the imperial notaries. After the fall of the empire, C. fell into the hands of ecclesiastical notaries; by them it was communicated to the conveyancers of the church, who performed the duties of the conveyancer for some centuries, till after the revival of letters, when the art again passed to laymen.

The feudal system does not seem to have been generally introduced into Great Britain till after the Conquest, though traces of it are to be found earlier. The inherent character of the feudal tenure is a grant of land made voluntarily by a king or leader, on the condition of the fidelity of the grantee and military service. While, on the one hand, the superior was a protector to the vassal in time of trouble; on the other hand, the vassal was exposed to the cupidity and rapacity of the superior, whose right to casualties or feudal incidents enabled him to oppress his vassals. The nature of these casualties or incidents will be explained under FINE, QUIT-RENT, HERIOT, COPY-HOLD, ESCHEAT, WARDSHIP, MARRIAGE. One of the most curious of these incidents was that last mentioned. A mail heir required the consent of his superior, and large fines were exacted for the consent. In the time of Charles I, the Earl of Warwick exacted £10,000—equal to a much larger sum now—for his consent to a lady-vassal marrying a husband in every respect suitable.

So long as feudal forms are retained, C. must be complex and expensive. Public opinion has latterly tended unmistakably towards a thorough abolition of the complex and expensive deeds required in the sale and mortgage of land; and the legislature has of late years done much towards their reform. Movable property is usually conveyed by delivery, but there are exceptions; thus, if it has been part of the bargain that the sale has to be completed by writing, the contract must be reduced to writing; and by statute, ships must be conveyed by a writing, which must be entered in the appropriate register, so as to shew any change of ownership.

CO'NVICT (from the Latin) means a person convicted of any criminal charge. The term came by custom to be applied to persons subject to punishment for the more serious class of offences, and of late its meaning has become almost entirely restricted to the class of criminals who need to be transported to the distant colonies of Britain. These criminals are now condemned to penal servitude for longer or shorter periods, and are usually spoken of as convicts under penal discipline, while offenders sentenced to short periods of detention in the ordinary jails are called prisoners. The convicts are confined in special C. establishments in different parts of the United Kingdom. The earlier history of the treatment of these criminals will be found under the head TRANSPORTATION. In the year 1840, the

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system of transportation to the chief penal colony, New South Wales, was suspended. Grave doubts had become prevalent as to the efficiency of the system, and all questions created by these doubts were solved by the refusal of the colonies to receive convicts, and the impossibility of disposing of them abroad, except in trifling numbers to the small district of Western Australia. It was thus necessary to solve the question, how these convicts could be treated at home in a manner consistent with the objects of punishment—the protection of the community, and the reformation of the offender to the extent to which that is practicable. Before this necessity occurred, considerable progress had been made in prison-discipline by arrangements which, without subjecting criminals to absolute silence or absolute solitude, separated them from the contaminating society of each other. It was naturally supposed that a system found beneficial for ordinary prisoners would suit convicts. But it was discovered that the discipline beneficially applied during a short period of imprisonment, could not be endured for a long period without physical and mental deterioration; and that the depression and anxiety created by their long sentences—sometimes for twenty years, and sometimes for life—made convicts break down under it within the period for which it could be quite easily endured by ordinary prisoners. It is a fixed principle of prison-discipline, that while punishment may be made to any extent disagreeable, it is never to be permitted, if possible, to injure either the body or the mind. It was found unsafe to subject male convicts to separate imprisonment for more than eight months; females, owing to some constitutional difference, are found to bear it without detriment for four months longer. At the end of eight months, then, or a year, as the case may be, the C. is gradually, so far as is consistent with safe custody, brought back into the habits of the freer population. It is usual to call the early stage of their discipline the probationary, and the later the reformatory. In the latter, they are associated under precautions and careful inspection, and are occupied in trades in which they may make their bread when free. Public works, such as the breakwater, quarries, and fortress at Portland, and the works at Chatham, and Portsmouth, afford a valuable outlet for C. labor. In such establishments may be seen a thousand men or more, with hammers, mattocks, axes, and all descriptions of formidable tools, working under the eye of their warders as quietly and systematically as ordinary laborers. There are establishments where, as far as possible, the same system is administered to females—as at Woking and the general prison for Scotland at Perth. The great hold by which the convicts are kept in order is the system popularly called "the mark system," under which, by steady application to work, convicts earn a remission or part of their sentence. Conduct is not taken into account in assigning these marks, but on the occasion of any specific misconduct a proportion of earned and registered marks is forfeited. The present C. establishments of the United Kingdom are: In England—Dartmoor, in which the great proportion are invalids; Portland, Portsmouth, Chatham, and Borstal, for males, in each of which there are public works; Pentonville, Parkhurst, Wormwood Scrubs, and Brixton, for males; Woking and Milbank for males and females; and Fulham, for females. In Scotland, the C. department of the general prison at Perth is occupied by a limited number of males for the first nine months of their sentence (after which they go to public works prisons in England), and by females for the whole period. In Ireland—Spike Island (with Forts Camden and Carlyle) and Lusk for males; and Mountjoy for males and females. The number of convicts in England on 31st March, 1877 was—males, 8843; females, 1251; Scotland (1876), males, 55; females, 284; Ireland (1876), males, 891; females, 963; Western Australia, 350.

CONVOCA'TIONS (from Lat. *convocare*, to call together) were originally synods of the clergy or the ancient ecclesiastical councils of the archbishop, but became incorporated into the English constitution of church and state, and endued with certain parliamentary privileges. Some writers distinguish between councils and C. —the former as being for spiritual purposes, and summoned without authority from the crown; the latter as being for civil purposes, and by command of the crown. The two however in process of time, especially after the Conquest, became gradually blended; C. made canons, and councils, granted subsidies, and all distinction had disappeared before the Reformation. The circumstances attending the famous assembly at Northampton, 1282, in the reign of Edward I., helped to settle the form

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which C. have since assumed. In England the provinces of Canterbury and York have each their convocation. Previous to the Reformation these were sometimes convened into a *National* Synod, but since then matters have usually been concluded in the C. of Canterbury and transmitted to York for concurrence. A convocation consists of three elements—1. The archbishop; 2. The bishops; 3. The clergy of the second order. They originally met in one assembly, but since the beginning of the 14th c. the clergy in the province of Canterbury have retired into a distinct chamber, presided over by a *prolocutor*, with officers and journals of their own. These two bodies are called the Upper and Lower Houses. In the Convocation of York the same distinction exists, but on the rare occasions of their meeting, the business has been generally conducted in one assembly. The archbishop has the sole power of summoning, presiding, and proroguing; he has also a veto upon all measures. He cannot, however, summon without authority from the crown. The Upper House is the proper *locus synodi*, where the bishops have a right to sit and vote, and before the Reformation the mitred abbots had place there also. The Lower House consists of the lesser dignitaries, as deans and archdeacons, and the proctors sent by capitular bodies and by the parochial clergy. In Canterbury, the beneficed clergy only elect, and they send one proctor for each diocese; in York, all the clergy elect, and send one proctor for each archdeaconry. The Lower House deliberates on matters proposed by the archbishop; it may present petitions to the Upper House and state grievances, be with it in judicature on persons convened, and dissent from and so hinder the passing of any synodical act. The passing of subsidies in convocation ceased in 1665, and the records were destroyed in the fire of London in the following year. Meetings of convocation fell into abeyance from the political troubles caused by the Revolution of 1688. They have been revived with considerable advantage to the church, but their action has been and is greatly restricted. In Ireland, the C. of the four provinces assembled at Dublin, all together, and were on the model of those in England. At the Union, no provision was made with respect to this matter, and since then there has not been even a formal assembling of the Irish Convocation. An act of parliament was passed in 1663, for regulating the meetings of convocation in Scotland; but shortly after the Revolution of 1688, the Episcopal Church ceased to be the national church of that country; and ever since, the meetings of the Presbyterian Church, embracing clergy and laity, have been called General Assemblies. See ASSEMBLY, SYNOD.

The position of the church of England as respects its C. is exceedingly anomalous, but is incidental to certain circumstances in the constitution and polity of the country. As essentially interwoven with the state, the church possesses no independent action; its articles, liturgy, organisation as to benefices, &c., are all regulated by parliament; while its discipline falls within the scope of the ecclesiastical courts, a class of tribunals apart from the ministering clergy. The church, therefore, in its capacity as an institution to teach certain doctrines of religion, is left little to do in the way of jurisdiction. It is further urged, as a reason for restricting the power of Convocation, that being purely sacerdotal, it might be apt to run into excesses, and put forth claims adverse to the prevailing tone of sentiment on religious matters; that, in short, as things stand, it is safer for the public to be under the authority of parliament than to be subject to the ordinances of a body of ecclesiastics. At the same time, it is generally allowed that some kind of reform is desirable, though how this should be effected in a manner satisfactory to all parties, it would be difficult to say. The convocations of Canterbury and York assemble annually at the opening of parliament, each keeping up its own distinctive customs. See Trevor's "Convocations of the Two Provinces," Cardwell's "Synodalia," and "Documentary Annals;" Lathbury's "History of the Convocation of the Church of England."

CONVO'LVULUS (Lat. *convolvo*, to twine together), a genus of plants, the type of the exogenous natural order CONVOLVULACEÆ. This order contains nearly 700 known species, herbaceous and shrubby; generally with a twining stem and milky juice; large and beautiful flowers; a 5-partite calyx; a monopetalous corolla, with regular 5-lobed and plaited limb; five stamens; the ovary free, with 1—4 cells and few ovules; the fruit a capsule, sometimes succulent. The plants of this order are very abundant in the tropics, but comparatively rare in cold climates. Many are

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cultivated as ornamental plants, particularly species of *Convolvulus* and *Ipomœa*. The acrid milky juice is often strongly purgative; and jalap and scammony are products of this order. Some species, however, have large farinaceous roots, capable of being used as food, of which the Batatas (q. v.) or Sweet Potato, is the most important. A few are natives of Britain, and are known by the name of BINDWEED. *C. arvensis* is a troublesome weed in some sandy soils in England, and *Calystegia sepium* in richer soils. The former has rose-colored fragrant flowers, the latter large white flowers. Both are ornamental; the latter is now often planted to cover posts and trellises. *C. scammonia* yields scammony, and the root of *C. panduratus* is used as a purgative in the United States. *C. scoparius*, a shrubby species, native of the Canary Isles, yields one of the kinds of wood called rosewood, which has a strong smell of roses.

CO'NVOY (Fr. *convoi*) is the name given to one or more ships of war appointed to protect a fleet of merchant-vessels against the attacks of an enemy or of pirates. If a merchant-ship part company with the C., or neglect to obey the signals, all claims of insurance are forfeited. The name is sometimes applied to the merchant-vessels so escorted. In the military service, a C. is, properly speaking, a train of wagons laden with provisions or warlike stores; the term, however, is applied also to the detachment of troops, or escort, appointed to protect such a train.

CONVU'LSIONARIES, the name given to a fanatical set of Jansenists who sprang up in France about 1730. Their meeting-place was the churchyard of St Medardus, in a suburb of Paris, where was the tomb of a certain Francis of Paris, who died in 1727, and was reckoned very holy by the Jansenists on account of his extravagant asceticism. At this tomb a multitude of people poured forth fanatical prayers, preachments, and prophesyings. Miracles are also allowed to have been performed, for proof of which we are referred to a work written by M. Montgeron, a French senator, and entitled "La Verité des Miracles opérés par l'intercession de François de Paris" (Paris, 1737). After 1731, the fanaticism of the C. increased to utter madness. "They threw themselves into the most violent contortions of body, rolled about on the ground, imitated birds, beasts, and fishes, and at last, when they had completely spent themselves, went off in a swoon." In 1733, the king issued an order for the imprisonment of these fanatics, but it was found impossible to put a complete stop to the mischief. They took to predicting the downfall of the throne and the church, which prophecy the French Revolution appeared to fulfil. They were not much heard of in Paris after the middle of the last century, but have occurred in country-places at various times within the present century. They brought Jansenism into so much disrepute, that Voltaire declared the tomb of Francis to be the grave of Jansenism.

CONVU'LSIONS, a form of disease very frequently affecting infancy, in which the body is thrown into violent spasmodic contractions, the sensibility and voluntary motion being for a time suspended. A fit of C. may last from a few minutes to some hours, and may readily prove fatal, if not relieved within a short period. The first symptom observed is often a twitching of particular muscles or groups of muscles, and a change in the habitual expression or color of the face, with distension of the features, and turning of the globes of the eyes suddenly upwards. The fingers are sometimes clenched in the palm, and the feet turned inwards; sometimes, however, C. occur absolutely without warnings of this kind, and even in the midst of perfect apparent health. Their cause is usually to be found in some source of irritation, capable of producing fever if long continued; as, for instance, disordered dentition, worms in the intestines, hooping-cough, &c. Most epidemic fevers are also apt to be attended, in children, by C. in their early stages; and diseases of the brain and its membranes at every stage of their progress. C. are greatly promoted by bad ventilation and injudicious feeding, with deficient exercise; and a great part of the cure consists in discovering and removing the cause of the disease.

When a child is suddenly seized with C., or with a tendency to spasm, such as twitching of the features, or contractions of the fingers and toes, it should be placed at once in a very free current of air, with its feet towards the fire; the extremities should be kept warm, and a cold lotion may be applied to the head, especially if there is much flushing of the face; a little castor oil may be given if the bowels are

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confined; and if there is a flatulence, the belly may be rubbed with a warm hand, or with some simple stimulating liniment, such as camphorated oil. Not much more can be done without medical assistance; but in the event of the case being very serious, and medical aid at a great distance, it might, perhaps, be right to cause the child to inhale a little chloroform, great care being taken that plenty of air is also admitted to the lungs. The strictly medical treatment commonly consists in the administration of medicines adapted to the state of the bowels, with the application of cold to the head, and sometimes the inhalation of chloroform. Leeches and bleeding are very rarely useful, though too often employed.

C. are rare amongst horses and cattle. In young dogs, however, they frequently occur from intestinal worms, disordered digestion, or in connection with distemper or other debilitating diseases: they usually disappear when their special causes are removed.

CO'NWAY, or Aberco'nway, a seaport town of Caernarvonshire, North Wales, on the estuary of the Conway, here crossed by a fine tubular, and a suspension bridge, 22 miles north-east of Caernavon. The town, which is triangular in form, is beautifully situated on a steep slope on the left bank of the Conway, and is surrounded by walls 12 feet thick, with towers and battlements. The principal streets are well proportioned and regular, and contain several ancient houses. C. Castle, one of the noblest castellated structures in Britain, stands on a precipice overlooking the river. It was first built by Hugh Lupus, Earl of Chester, and rebuilt in 1283 by Edward I., to check the Welsh. Its walls are 12 to 15 feet thick, with eight vast towers, four of which are each surmounted by a slender turret. In 1646, the parliamentary forces took the castle, but did not injure it; but after the Restoration it was dismantled by the Earl of Conway. The Plâs Mawr, "Great Mansion," is a noble pile erected in 1585, in the Elizabethan style, with the exterior and interior profusely ornamented with figures, coats of arms, scrolls, &c. The harbor is dry at low water. Conway was an opulent town until the great plague in 1607 almost depopulated it. A Cistercian abbey was founded here by Llywelyn ab Jorwerth, prince of North Wales. Llywelyn the Great, and several other princes and illustrious persons were buried in it. The Castle Hotel at present occupies its site. Pop. (1871) 2·20. C. unites with Caernarvon, Bangor, Criccieth, Nevin, and Pwllheli in returning one member to parliament.

CONWAY a river in North Wales, 30 miles long—one of the most noted in Wales for the bold romantic scenery along its higher as well as the rich beautiful scenery along its lower course. It rises in a small mountain-lake where the three counties, Merioneth, Denbigh, and Caernarvon meet, and runs north-west, north-east, and north, past Llanrwst, Trefriw, and Conway, to Beaumaris Bay in the Irish Sea. It receives many rapid mountain-streams. In the lower 12 miles of its course it is a large, winding, smooth stream, up which the tide flows, and is navigable for vessels of 100 tons. At Conway it is half a mile broad at spring-tides, which rise here 21 to 24 feet. The C. has been famous for its pearls since Roman times.

CONY, an old English name for the rabbit, but employed in the authorised and other versions of the Bible as the translation of a Hebrew word which certainly does not designate the rabbit. The C. of the Old Testament is with the greatest probability supposed to be the Daman (q. v.) or ashkoko.

CONY'ZA, a genus of plants of the natural order *Compositæ*, sub-order *Corymbiferæ*, of which one species, *C. squarrosa* (also known as *Inula conyza*), is of frequent occurrence in England and throughout great part of Europe. It has a stem two or three feet high, downy ovato lanceolate leaves, and yellow flowers. It receives the English names Fleabane and Ploughman's Spikenard, and has a strong peculiar smell, which is said to drive away flees and gnats. In most of the languages of Europe, it bears names referring to this property.

COOK, Captain James, one of the most eminent among England's celebrated navigators, was born October 27, 1728, at Marton, in Yorkshire, where his father was an agricultural laborer. At first apprenticed to a haberdasher, he afterwards went to sea, and having spent some years in coasting-vessels, entered the royal navy, in which he soon rose to the rank of master. The charts and observations which he drew up as marine-surveyor of the coasts of Newfoundland and Labrador, intro-

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duced him to the notice of the Royal Society, who offered him the command of an expedition to the Pacific Ocean, to make an observation of the transit of Venus over the face of the sun. The voyage being one to his taste, C. immediately accepted the offer, and set sail from Plymouth on the 26th of August, 1768, in the *Endeavor*, a small ship of 370 tons. The expedition arrived at Tahiti (or Otaheite, as he named it) on the 13th April of the following year; and the transit was witnessed in a most satisfactory manner on the 3rd June. Leaving Tahiti on the 13th July, C. visited New Zealand, which had not been touched at by Europeans for a century and a quarter; and after exploring the coast for six months, sailed westward, reaching (on the 19th April 1770) New Holland, now Australia, which he called New South Wales, and took possession of in the name of Great Britain. Having explored a large portion of the coast, he steered for New Guinea, passing between Australia and that island, and thus proving, what had heretofore been doubted, that the two were distinct islands. Continuing his voyage by Java, Batavia, and the Cape of Good Hope, C. anchored in the Downs on 12th June 1771. This voyage, besides vastly increasing geographical knowledge—one of the important results in this respect being, that it proved that neither Australia nor New Zealand belonged to the southern continent at this time supposed to exist, and that to the northward of lat. 40° s. no continent could exist—also added not a little to the sciences of botany and astronomy. A second voyage, for the discovery of what was then called the *Terra Australis Incognita*, which was now believed to lie in higher latitudes than had hitherto been explored, was undertaken by C. in the year of his return; and the expedition, consisting of two ships—the *Resolution* and the *Adventure*—sailed from Plymouth on the 13th July 1772. It would be out of the scope of this article to follow Captain C. through his three years' navigation of the Pacific and Southern Oceans, in the course of which time he sailed upwards of 20,000 leagues. It can only be stated generally, that his voyage proved the non-existence of land of any extent between the 50th and 70th parallels. C. arrived in England again on the 30th July 1775. So admirable had been his arrangements for the health of his crew, that during the whole voyage he lost only one man by sickness; and so skilful his seamanship that not a spar of any consequence was lost. C. wrote an account of his second voyage himself. The belief in a practicable North-west Passage, notwithstanding the failure of attempts extending over two centuries, still held possession of men's minds; and C. had no sooner returned from his second voyage, than he offered his services to the Admiralty, who had resolved on another effort for the discovery. They were gladly accepted, and C. determined to seek the passage by the way of Behring's Strait, instead of by Baffin's Bay and Davis' Strait, the routes formerly attempted. In his old ship, the *Resolution*, accompanied by Captain Clerke in the *Discovery*, C. sailed from Plymouth on the 12th of July 1776. In this last voyage, C. met his death at the hands of savages, on the island of Hawaii, while endeavoring to recover a boat which had been stolen from the *Discovery*. This tragical event occurred on the 14th February 1779; not, however, before C. had made valuable additions to our geographical knowledge of the coasts of America and Asia, in the region of Behring's Strait. The news of his death occasioned deep and general regret in England. The king granted his widow a pension of £200, and each of his children £25: while the Royal Society did honor to his name, by having a gold medal struck in his commemoration. C. was one of England's greatest navigators. A practical and scientific seaman, he was also a sagacious, self-possessed commander, kind although strict to his crew, and marked by indomitable perseverance and ready decision.

COO'KERY. To prepare and soften food by the action of fire, and so to render it fit for digestion by the human stomach, has been a general custom from remote times; and more or less of skill in accomplishing this primary end has been displayed, according to the knowledge, wealth, and refinement possessed by each nation or people.

In ancient times, the occasion of a banquet appears chiefly to have arisen in a sacrifice to the gods, when a part of the victim was brought to the dwelling of the sacrificer, and was cooked for the feast. Birthdays, funerals, and victories were also celebrated in this manner. "The Persians," says Herodotus, "were accustomed to honor, above all others, that day on which they were born, when the rich

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among them would sacrifice an ox, a horse, or a camel, which they roasted whole in ovens, while the poorer class gave only the smaller animals, as sheep. Yet the Persians were not great eaters of meat, but consumed much sweet food, and did not use salt." The appendages to the higher order of banquets were most magnificent, so that in point of quantity and display they were very expensive. Herodotus says on this head, "that the Greeks who invited Xerxes to supper all came to the extremity of ruin; and that, wherever he took two meals, dining as well as supping, that city was utterly ruined."

The Egyptians, it is said, were great bread-eaters. Though they possessed wheaten-flour of the finest sorts, they do not appear to have used it for their common bread, which was made of spelt, or of the centre of the lotus dried and pounded. Fish they salted and dried in the sun; quails, ducks, and small birds they salted and ate raw. We read of their roasting and boiling the flesh of the ox. Large flocks of geese and of fowls were kept by them for the use of the table, hence their plan for the artificial hatching of eggs. "Fish was used by all classes except the priests, but the staple food of the people consisted of vegetables, of which they had a large supply." Herodotus mentions their making beer from barley, which they called *zythus*. We may still see the form in which their food came to table; ducks, loaves made round, and some biscuits and cakes, which have been taken from Egyptian tombs, are to be found in the British Museum. Apollonius, who wrote a treatise on the feasts of the Egyptians, says that they ate in a sitting posture, using the very simplest and most wholesome food.

There appears to have been considerable difference as to the manner in which good eating was appreciated in different parts of Greece. The Athenian meals are ridiculed by the comedians for their parsimony. After the Homeric age of simplicity, in which roast and boiled meat seems to have sufficed the kingly table, a diversity of preparation was obtained in cooking, and a certain epicureanism displayed in the quality, seasoning, and method of dressing food. The names of many authors of C. books are preserved in the writings of Athenæus; that of Archestratus, who is called the guide of Epicurus in his pleasures, and styled the inventor of made dishes, being the most renowned.

Fish was a principal article of food with all classes of Greeks; but with the wealthier, much skill and delicacy were used in cooking it, and choice and expensive sorts were sought after. Archestratus writes of "a boiled torpedo done in oil and wine, and fragrant herbs, and some thin grated cheese." Fish, stuffed with forcemeat and fried, boiled in pickle, baked in fig-leaves soaked in oil, cooked in hot ashes, &c., are among the recipes we find recorded. Large quantities of salt-fish were brought from the shores of the Euxine and the Hellespont; and this, with meal, cheese, and onions, was the chief food of the armies and navies when on service. The Greeks boiled and roasted the flesh of sheep, pigs, lambs, and goats. They had poultry, small birds, and game, and sausages made of blood, partaking of the character of black-puddings. The bread made at Athens was the most celebrated; it was sometimes household, but chiefly bought in the market, and was made in great variety, as pan-loaves, rolls, sweet loaves, &c. The bread eaten by the poorer classes was made of barley, and sometimes flavored with oil, honey, poppy-seed, &c. Athenian cheese-cakes were also famous; and they had honey and sesame-cakes, which, with fresh and dried fruits, as figs, almonds, olives, and nuts seem to have been partaken of after dinner. They consumed vegetable food also, in abundance, and had cabbage, onions, lettuce, and so on.

In the Greek house there was no regular cook, though in the establishments of the wealthy several females were kept, to attend to the kitchen. The women, in general, saw to the requirements of the table, and even the lady of the house was not idle. Cooks stood in the market at Athens, ready to be hired for particular occasions; the most celebrated were those of Sicily; they were probably persons of some importance.

"To roast some beef, to carve a joint with neatness,
To boil up sauces, and to blow the fire,
Is anybody's task; he who does this
Is but a seasoner and broth-maker;
A cook is quite another thing. His mind

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Must comprehend all facts and circumstances:
Where is the place, and what the time of supper;
Who are the guests, and who the entertainer;
What fish he ought to buy, and where to buy it."
Quoted by Athenæus from Dionysius, a comic poet.

In the early days of Rome, a gruel made of barley, and called *puls*, was the principal food of the people, and with green and other vegetables was, till later times, the usual fare of the inferior classes—meat being used but sparingly. By degrees, however, a taste for better eating crept in; and after the Asiatic conquests luxury was imported. Lucullus introduced habits of epicureanism after his return from Asia; the gourmand Apicius earned for himself a deathless name. The wealthy Romans cared for the elegant serving of their table, as well as for the quality of viands placed before them. With them, as with the Greeks, fish was a necessary as well as a luxury: they took much trouble to procure their oysters, and gave large sums for other fish. We read of a mullet of six pounds sold for 8000 sesterces (£70, 16*s.* 8*d.*), and of the rhombus or turbot from Ravenna being held in high estimation. They seem to have been as clever as the French in preparing *surprizes*, and in carrying out *disguises* in their dishes. The *pistor*, who made the bread and pastry, and the *structor*, who composed artificial figures of fruit or flesh, and who also arranged the dishes, seem to have shared the duties of the cook. We read of dainties, as ring-doves and fieldfares, hares, capons, ducks, peacocks, pheasants, and the livers of geese; also of such formidable *pièce de résistance* as a "huge boar, surrounded with sucking-pigs made in sweet paste, which were distributed among the guests." The Romans prepared and cooked their food with oil to a great extent. Their meals probably consisted of two courses and a dessert, the first course being of materials intended to sharpen the appetite, and the second the "brunt of war," that is, a joint roasted or baked. The discovery or cultivation of vegetables, perhaps, gave rise to some proper names, as Lentulus, Fabius, &c. It is a Roman saying, that the number of persons at a repast should not be less than that of the Graces, nor more that that of the Muses. The Greeks and Romans used honey for the purposes for which we use sugar. The sugar-cane probably was cultivated in China, and its manufacture understood there; but the Greeks took it for a kind of concrete honey, and used it only for medicinal purposes.

Of ancient British C. nothing is known; it was probably of an extremely rude description. Hares, poultry and fish are said to have been forbidden as food. We do not find much mention of the art of C. in the Saxon chronicles. The Danes and Germans appear to have been great drinkers, and to have paid little attention to the preparation of their eatables. The Normans were more curious in these matters; some offices among them were held in right of the kitchen. In early English C. much use was made of the mortar. Oil and lard were used instead of butter. Several English C. books bear an early date, as "The Forme of Cury," by Mr. Pegge, 1390; and others date as follows: Sir J. Elliott's book, 1589; Abraham Veale's, 1575; "The Widdove's Treasure," 1625.

The C. of France was probably of an imperfect and rude kind till the introduction of Italian tastes by the princesses of the House of Medici. The ancient use of oil was modified by the discovery made by the French, of dressing meat in its own gravy. In our own day there is no denying that the French cook is a true artist. We may, if we please, impute the trouble he takes with the dressing of his meat to the inferiority of the material, but this can be said of meat only; the preparation of vegetables and fruits is attended to with equal care, although probably the French have some of these things in greater perfection than ourselves. The great difference between French and English C. consists in the fact that they cook their meat much longer than we do. They consider that this renders it more digestible. They are thereby enabled to multiply dishes by altering or annihilating the original taste of the meat and making it a vehicle for foreign flavors. The variety, daintiness, and grace of form which dishes thus acquire, is advantageously made use of by us when we admit them at our repasts to mingle with our heavier and radically English joints. But for ourselves, we desiderate the integrity of the form and flavor of our meats, considering that to be *over cooking* which the French think only sufficient. In the point of economy, the French have a decided superiority over us. The French cook throws nothing away. Instead of going to the butcher for meat for stock, as our

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English cook does, he uses the trimmings for stock and glaze, and the skimmings of his boiled meats for purposes to which we apply butter or lard; and like a true workman, he produces great results from small means. This requires an education which few mistresses demand and few cooks obtain, but which when achieved, justifies the expression of Voltaire:

Qu'un cuisinier est un mortel divin!

The estimation in which the services of a cook are held, may be known by the large salary attached to the office in great families, hotels, and club-houses. A visit to the kitchens of one of these establishments will teach us what a highly important post is that of *chef de cuisine*. There must be in such a person not only the necessary knowledge how things are to be done, but the power to arrange and direct the work of the numerous assistants, as to the exact part they must fulfil at each moment of their long and busy day. These places, indeed, are excellent schools for cooks, where they can undergo that severe training, without which a thorough practical knowledge of the business cannot be attained. It is indeed to be regretted—because a source of so much disappointment, discomfort, and waste—that a knowledge of plain C., at least, is not more desired by mistresses for themselves. That acquirement, and household management generally, are important enough to be made part of the education of all classes. The poorer would thereby be enabled both to lay out their money profitably, and to prepare their food so that it might satisfy and nourish them; and the heads of establishments in the upper classes would be more in a position to direct, appreciate, or, if necessary, condemn the performance of the cook. A cultivated and elegant taste is as much shewn in the arrangement of viands as in the furnishing and decoration of the choicest boudoir.

The art of C., as a branch of female education, has latterly engaged considerable attention in England; and there are in London, Edinburgh, and other places, establishments where young ladies receive this kind of instruction. Recently, a school of cookery has been attached to the South Kensington Museum. Efforts are also made to teach C. to the humbler classes of girls, but much in this respect remains to be done. For any shortcomings in cooking, however, the taste of the English is in some measure accountable. The universal practice of roasting large pieces of meat, which cannot be consumed while hot, causes no little waste, and is obstructive of improvement. The Scotch—who derive some part of their C., along with other usages, from the French—deal more in soup and boiled meat than the English, and their processes, while not less savory, are perhaps more economical.

So numerous are the books on C., that it would be out of our power to name even all the excellent ones. We can only say that Miss Acton's "Cookery Book," Webster and Parkes' "Encyclopædia of Domestic Economy," Soyer's work, and that of Francatelli, cook at the Reform Club, are all good; "Meg Dods's Cookery" is also excellent. For cheapness and simplicity, we may refer to Chambers's "Cookery for Young Housewives" (1s.). The two last mentioned embrace Scotch along with English cookery. See FOOD, BOILING, ROASTING, &c.

COOKERY, Army, is now becoming an important feature in the English military system. The sufferings in the Crimea in the winter of 1854—5 drew public attention to the subject; it was then found that C. was little understood by the British troops, and that the soldiers seldom had meat otherwise than boiled. M. Soyer was sent out by the government, principally to advise in reference to hospital C. but also to improve the system of camp-C., so far as military routine would allow. He devised new forms of stove, and constructed recipes for using to the best advantage all the available provisions for a camp. The officers at Sebastopol made a highly favorable report of Soyer's *field-kitchen*, a kind of camp-stove, with a caldron holding 12½ gallons; two such stoves would easily cook for a company of 100 men; both could be carried by one mule, with sufficient dry wood for three days' fuel. Though mainly intended for boiling, the apparatus afforded facilities for many varieties of cooking. When M. Soyer returned to England, he made a few improvements; and finally the apparatus presented itself as a sort of upright can, suitable for boiling, steaming, baking, roasting, stewing, and making tea or coffee; with 1¼ lbs. of fuel, one of these would cook for 50 men; and if twenty such were placed near together, four cooks could serve for 1000 men.

A committee which inquired on the subject of barrack economy some years ago, recommended that every large barrack should have a bakery with two ovens, where

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the men could learn to make and bake their own bread; and that the barrack-kitchens should be so furnished as to enable the men to bake their meat if so inclined, instead of being confined, as heretofore, almost wholly to boiled dinners. A school of cookery has been formed at Aldershot, where men are trained to act as sergeant-cooks, of whom there is now one to each regiment. His duty is to superintend and direct the operations of the soldiers detailed from the several companies to act as cooks.

At various times in 1859 and 1860, certain highly ingenious forms of apparatus were tried, to test the possibility of cooking for troops while the *the kitchen itself is on the march*. One of these inventions consists of a compact set of stoves and caldrons, fitted into a wagon, and has been found on trial to answer the purpose perfectly.

COOK ISLANDS, otherwise known as the Harvey Archipelago, were visited rather than discovered by the navigator whose name they bear, during his first voyage. They lie about midway between the Society and Navigator groups, near lat. 22° s. and long. 158° w. The principal members of the cluster are Mangeia, Atiou, Harvey, and Raratonga. The natives, estimated at about 15,000, have been generally converted to Christianity; Raratonga, in particular, being one of the most successful missions in Polynesia.

COOK'S INLET, one of the many gulfs of the Pacific Ocean on the north-west coast of America, lies between Prince William's Sound on the east and Bristol Bay on the west, in lat. 58°—61° n., long. 151°—154° w. It was explored in 1778 by the navigator whose name it bears, in the vain hope of its leading him into the Arctic Sea.

COOK'S STRAIT, discovered by Captain Cook on his first voyage, separates the north and middle islands of the New Zealand group. The proof of its existence dissipated the popular belief that New Zealand, as previously known, was merely a salient point of a great southern continent.

COO'KSTOWN, a town in the northeast of the county of Tyrone, Ireland, on the left bank of the Ballinderry, 23 miles east-north-east of Omagh. It consists of one very long and broad street, with a row of trees on each side. It has a linen trade. Pop. (1871) 3501.

COOLERS, or Contri'vances for Cooling, are resorted to by the brewer, and by the distiller of alcohol and other liquids. See BEER and DISTILLATION. They are also used in warm weather for the cooling of water (q. v.)

COO'LIES, or Coulies, originally the name of one of the aboriginal or hill tribes of Hindustan. From the circumstance that many of this tribe are employed as laborers and porters in Bombay and other places, the name is applied by Europeans in Hindustan to porters in general; and it is now used to denote emigrant laborers from India and China to tropical and other countries. The importation of this useful class of laborers to the Mauritius, West Indies, and British settlements on the mainland of South America, has grown up as a result of negro emancipation—the emancipated slaves showing an indisposition to become regular laborers. Hence the necessity for resorting to imported labor from India or China.

Much difference of opinion prevails as to the propriety of coolie immigration. It is one of those vexed questions on which something can be said on both sides. We would refer to Mr A. Trollope's "West Indies and Spanish Main" (1860), for some general observations on the introduction of C. to certain British West India settlements. A later work by Mr Jenkins, "The Coolie, his Rights and Wrongs" (1871), though relating exclusively to British Guiana, is full of most interesting matter. The conclusion at which he arrives regarding the system is thus expressed: "Taking a fair review of the whole system, it is one which, spite of its disabilities, its difficulties, its present evils, is full of promise, and, in my belief, can be made, with care, and skill, and honest endeavor, not only an organisation of labor as successful as any hitherto attempted, but one leading to almost colossal benefits" (p. 267). Mr Jenkins further asserts, that "any one who has seen the coolie in British Guiana is forced to admit that he has undergone a change for the better. In illustration of this, we may mention that the number of immigrant depositors in the British

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Guiana Savings Bank on June 13, 1870, was 1817, whose deposits amounted to 138,425 dollars, or over 70 dollars a head. The commissioners appointed by her Majesty to take evidence on the working of the system at the time Mr Jenkins went out, state in their Report (pp. 854, 855): "From papers submitted by the Immigration Agent-general, the commissioners gather, that in 12 ships which sailed with returning Indian immigrants between 15th November 1884 and the 11th November 1869, 2828 immigrants took away with them money acquired in the colony to the amount of 433,369 dollars, or £94,452." The great draw-backs of the system appear to be the reckless mode of recruiting in India; the insecurity, if not the actual worthlessness, in Guiana of contracts drawn up in the former country; the severe penalties attached to breach of contract, and the practical difficulties, as the law stands at present, in the way of the coolie obtaining a remedy for any injustice inflicted on him. Immigration from China was stopped for all the West Indies in 1867, on account of the Chinese government insisting on a return passage at the end of five years, which the planters find will not pay them for their outlay. The total number of C. at present in British Guiana is about 50,000.

The report (1872) of the governor of *Trinidad* on the coolie question is satisfactory. In 1870 various laws were passed, all of a just and beneficent character. "Among the most important provisions," says Governor Longden, "are those which regulate the allotment of immigrants upon their arrival in the colony, the supply of food to them during the first two years of their residence, their lodging, the medical attendance and hospitals provided for them, their wages, the exemption of women from labor, the prevention of vagrancy, and the right of repatriation." In proof of this it may be stated, that although the coolie has a right to a free passage back to India at the public expense, after a continuous residence in the island for ten years, in many cases he has preferred to commute this right for a grant of ten acres of crown land, and to settle permanently in the colony. The number of Indian immigrants in 1871 amounted to 27,400. In addition to these must be reckoned 1400 Chinese.

Sir J. P. Grant, governor of *Jamaica*, is no less emphatic in expressing his opinion that a great change for the better has taken place in the treatment of the coolie in that island also. His words are ("Report" for 1871): "Under the old state of things this department [the Immigration Department] in Jamaica was in a disgraceful state, but it has now been completely reformed under the new system introduced by the new law of 1869." This law secures to the coolie full payment of day-wages at the rate fixed by law as a minimum, unless where he prefers task-work, and also regular daily rations during the whole of his five years' term of indenture, besides putting an end to all stoppages of wages at the arbitrament of only one party to the bargain. Many of the details of medical supervision are extremely creditable to the planters. The census returns for 1872 give the gross number of Indians at 7798. Here also, as well as in Trinidad, the C. shew a disposition to become settlers on the crown lands.

The report for 1871, from the island of *Mauritius* is less encouraging, which is much to be deplored, because that island contains more C. than all the rest of our colonial possessions put together. Out of a total population of 328,000, more than 210,000 were Indian immigrants. It would seem that the relations between employers and employed are not quite satisfactory, though here too, improvement can be noted.

Besides what may be called the *legitimate* traffic in Chinese C. (stopped at present), an infamous counterfeit was long carried on at Macao (q. v.). Native crimps brought thousands of their countrymen to that Portuguese island, and shipped them for Cuba and Peru. This "involuntary emigration," as it has been called, began in 1848, and as many as 13,000 persons were shipped in the course of a year; but as in reality it was nothing more than an elaborate system of kidnapping, the Chinese and British governments, in 1872, prohibited any vessel suspected of being engaged in this trade, from fitting out in any Chinese or British port, and the "trade" was practically destroyed in consequence. At the close of 1873, the Portuguese government formally declared the "exportation" of C. illegal, and the atrocious traffic may now be considered at an end.

Similar to the coolie immigration, though the laborers are not called C., is the importation of Polynesian natives into Queensland to work on the sugar plantations.

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and into the Fiji Islands. By laws of 1868 and 1875, the Imperial Parliament has secured the rights of a helpless but industrious race. See "In Quest of Coolies," by J. L. A. Hope (1872).

COOMA'SSIE, the capital of the kingdom of Ashantee, Western Africa, is situated about 120 miles n.n.w. of Cape Coast Castle, in lat. 6° 35′ n., long. 2° 12′ w. C. occupies the side of a rocky hill, and is about four miles in circuit. The walls of the houses are mostly formed of stakes and wattle-work, the interstices being filled up with clay; the roofs are of palm-leaves. The king's palace is here. C. was captured and burned in 1874, during the war with Great Britain. See ASHANTEE. Pop. stated by natives to be 100,000; but other reports, including observations during the war, say 20,000.

COOPER, James Fenimore, an American novelist, was born at Burlington, New Jersey, United States, September 15, 1789. Having received his early education from a private tutor, he, at the age of 13, passed to Yale College, and after three years' study there, entered the American navy as a midshipman. He remained six years at sea, gathering the experience of which he was afterwards to make such good use in his novels. On his retirement from the sea in 1811, he married; and the next ten years of his life were spent in a quiet, domestic fashion. In 1821 appeared his first work, "Precaution," a novel that afforded no indication whatever of the talent he subsequently exhibited. In the following year, however, he published "The Spy," a tale which at once secured for him a place in the first rank of novelists. By not a few critics he was even elevated to a higher pedestal than that which Scott occupied; but time sobered their judgment, while it still left him a deservedly high position as a writer of fiction. In quick succession followed "The Pioneers," "The Pilot," "The Last of the Mohicans," "The Red Rover," and "The Prairie," with which C.'s genius culminated; for though between this date (1827) and 1850 he wrote about 26 different works, none of them equalled in merit those we have mentioned. The secret of C.'s success as a novelist lies in his graphic descriptive powers, and his thorough knowledge of the matters he describes—whether it be the boundless ocean or the broad prairie—together with an attentive study of character. Not a little of his popularity in America, however, must be attributed to his nationality; and in Europe a good deal of it was owing to the freshness of the scenes in which his stories were laid. About 1827, C. visited Europe, where he remained several years; the fruits of his sojourn, besides novels, being some ten volumes of sketches of European society, which added nothing to his reputation. Many of his works have been translated into most modern languages, and one—"The Spy"—can be read in Persian. C. died at Cooperstown, in the state of New York, 14th September 1851.

COOPER, Sir Astley, a celebrated English surgeon, was born in Brooke, in Norfolk, where his father was a curate, in August 1768. In his 16th year, he went to London, and placed himself under the care of Mr Cline, one of the most noted surgeons of his day. He devoted himself with ardor to his profession, and was a constant attender at the dissecting-rooms, and also at the lectures of the famous John Hunter. In 1787, C. was appointed demonstrator of anatomy at St Thomas's Hospital; and four years after he assisted Mr Cline, who was surgeon at St Thomas's, in the course of lectures on anatomy and surgery. In 1792, he was appointed Professor of Anatomy at Surgeon's Hall; and in 1800, surgeon to Guy's Hospital. In 1818, he received the professorship of comparative anatomy in the College of Surgeons. Meanwhile, C. had been enriching medical literature by various contributions. An essay on the effects resulting from the destruction of the *membrana tympani* gained him, in 1802, the Copley medal of the Royal Society, of which he was elected a fellow three years afterwards. In 1804—1807 appeared his great work on "Hernia," with illustrations mostly of life-size, a contribution of the utmost value to medical science—the anatomy of the disease and the mode of operating for its relief being alike ill understood before—though in a pecuniary point of view it proved very unprofitable to himself. The practical part of his profession was not neglected during this time. He was the first to attempt the tying of the carotid artery, an attempt which, though unsuccessful in his hands, has since proved effectual in the hands of other practitioners. His annual income, which in the fifth year of his practice only amounted to £100, had 1813 risen to

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the enormous sum of £21,000, perhaps the largest ever received by a surgeon. In 1817 he tried what has been considered the boldest experiment ever attempted in surgery, the tying of the aorta, which did not prove successful; and it has since been tried with no better result. In 1820 C. removed a steatomatous tumor from the head of George IV., who marked his appreciation of the operation by conferring a baronetcy upon C. some six months after. In 1822 he was elected one of the Court of Examiners of the College of Surgeons, and in 1827, President. In the following year he received the appointment of sergeant-surgeon to the king, and in 1830 was made Vice-president of the Royal Society. Other honors flowed in upon him. He was made a member of the French Institute, and corresponding member of the Royal Academy of Sciences, a D.C.L. of Oxford, and an LL.D. of Edinburgh. Ever busy with his pen as with his knife, he in 1822 published a work on "Dislocations and Fractures" which threw much new light on the subjects discussed, and also suggested improved methods of treatment. His treatise on the "Anatomy and Diseases of the Breast" (1829—1840), was characterized by all the care, research and originality which distinguished his previous works; so likewise was his "Anatomy of the Thymus Gland," 1832. C. died 12th February 1841. A colossal statue to his memory is erected in St. Paul's Cathedral, London. As a teacher C. possessed the faculty of communicating knowledge in a manner at once easy and agreeable, and he elevated medical surgery, the operations of which before his time have been described as a series of "frightful alternatives or hazardous compromises," into a science.

COO'PERAGE, the art of making vessels of pieces of wood bound together by hoops. It is a very ancient art, such vessels having been in use among the Romans at the period of the Christian era. The upright pieces forming the sides of a barrel or cask, or other cooper's work, are called *staves;* and as casks are usually larger in the middle than at the top and bottom, this swelling, called the *belly* or *bouge*, is formed by skilfully shaping each stave so that it shall form part of the required double conoid, and that, when all are built and hooped together, their edges shall coincide perfectly; for this purpose each stave is made broadest in the middle, and narrowed down in a curved line towards each end. A skilful cooper can work this curve so accurately, that no further fitting or alteration shall be needed when the staves are put together. The staves are made to meet at their inner edges, and by driving the hoops very hard, the inner part is compressed until the slight gaping outside is closed, and thus slight inaccuracies of fitting are remedied.

There are several branches of cooperage. The *wet* or *tight* cooper makes vessels for holding liquids. The *dry* cooper does inferior work, such as barrels for containing dry goods, where an inferior degree of accuracy is sufficient. The *white* cooper makes churns, pails, &c., which for the most part have straight sides.

The best work is made of oak, which must be thoroughly dried before being put together. In warm countries, the drying of the sun is sufficient, and casks are therefore mounted in summer only; but in Britain, artificial drying is commonly resorted to. The hoops are hammered down from the narrow to the wide part of the cask, by means of a mallet striking a piece of wood held against the hoop. Iron hoops are sometimes put on hot, in order that their contraction on cooling may bind the work together.

CO-OPERA'TION is a term applied to a system of united effort for commercial or industrial purposes. It refers simply to a joint-stock copartnery on ordinary commercial principles, with limited liability of members; but by the interposition of the legislature for protecting individual interests, and encouraging self-denial and thrift, it possesses some distinct features. Usually a co-operative society consists of a body, several hundreds in number, belonging to the manual laboring classes, clerks, shop-assistants, &c.; the object being the distribution of articles of daily consumption among the members. A store is established under a manager and assistants; goods of the best quality are purchased on favorable terms, and retailed to members at such an advance on cost price as will pay expenses and leave a small profit over. All the sales whatsoever are for ready money; no credit is given. Soundness in the articles bought and comparative cheapness are alone aimed at; and such results are attained by care in the management, and by adhering to the ready-money system. There is little trouble in book-keeping, no loss from giving credit

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In point of fact, the customers of the concern are their own shop-keepers. To carry out any such principle of co-operation with advantage, there must be a large intelligent population, along with mutual trust, and a considerable similarity of tastes.

Membership is constituted by payment of shares. Ordinarily, the share is one pound sterling, to be paid up at once, or by small weekly instalments. By 18 and 19 Vict. c. 63, a member can own shares to the amount of £200. The shares are not transferable, unless the rules of the society make them so in whole or part, but in general non-transferability is adopted, with power of withdrawal; this constitutes the chief difference between C. and the common joint-stock system of business. The peculiarity of making the shares personal to the holder is most valuable; for by it all stock-jobbing or gambling in shares is prevented. When a member dies, his shares are accounted for to his representatives. If more money is paid in by members than is wanted, the directors can order the overplus to be taken back. The first shilling paid in, and the last shilling at the credit of a member, on drawing out, are carried to a fund called Redemption-money, which is designed to make good the deterioration of property. In this and some other respects, however, societies differ, according to the rules established. In some societies, shareholders or members are alone entitled to purchase goods at the stores; in others, the privilege is extended to "friends of members" approved by the association.

By prudent management, numerous co-operative societies in England have reached an extraordinary degree of success. One of the more remarkable is the Rochdale Equitable Pioneers' Society. Beginning in 1844, with a capital of only £28, its affairs, at the end of 1877 stood thus: Number of members, 9722; amount of funds, £280,275; business done in 1877, £311,754; profits in 1877, £51,648. In the proceedings of this society is offered a surprising example of what may be done by C. when properly conducted. One material cause of the prosperous extension of this undertaking consists in the fact, that members allow their dividends and profits to accumulate to their credit, instead of drawing them out as they accrue, and spending them. Another feature of this society consists in setting aside a part of the profits for the support of an Educational Department, in which are comprehended a lending library, a reference library, news-rooms, and collections of globes, maps, and scientific instruments. Out of the successes of this society sprang several gigantic concerns at Rochdale and elsewhere. The most notable of the London societies is the Civil Service Supply Association, designed for the benefit of others than the poorer classes of the community. It has four thousand five hundred shareholders, and many thousands of members. The wages paid amount to nearly fifty thousand pounds a year. The premises which form the headquarters of the Association are valued at thirty-two thousand pounds. In the first year, 1867, the sales of the Association represented a value of £21,332; in the year ending August 1877, the value of the sales reached the large sum of £1,041,294. On an average the prices charged to members and clients are at the rate of ten per cent. above wholesale prices, thus allowing a profit to defray working expenses, which amount to about seven-and-a-half per cent. This allowance has proved more than sufficient; between March 1874 and August 1877, the surplus profit accumulated to the amount of very nearly one hundred thousand pounds. As the aim of the Association is "to supply articles at the lowest possible prices," it is proposed to reduce the present high rate of interest.

A step beyond retail store-keeping was taken in 1864 by the establishment of the North of England Co-operative Wholesale Society (Limited), the central office of which is at Manchester. Its object is to supply goods wholesale to co-operative stores. Besides importing foreign articles, the society purchases vast quantities of butter, provisions and dry goods in all parts of the United Kingdom; latterly, the manufacture of biscuits and the business of banking have been added to this comprehensive concern, which has numerous branches and agents. C., however, has gone even beyond this. At Rochdale, Leeds, and elsewhere, co-operative societies composed of working-men have set on foot large cotton-factories, flour-mills, or other industrial establishments, which compete in the general field of manufacturing enterprise. In these concerns, the operatives receive weekly wages, and also dividends on profits after paying for management.

Co-operative societies are registered pursuant to 18 and 19 Vict. c. 63, 20 and 21

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Vict. c. 101, and 30 and 31 Vict. c. 117. The rules of the society are binding, and may be legally enforced—protection is given to members, their wives, children and heirs in enforcing their just claims, and against any fraudulent dissolution of the society; the property of the society is declared to be vested in the trustee or treasurer, who may, with respect to the property of the society, sue and be sued in his own name; fraud committed with respect to the property of the society is punished by justices. With a view to afford means for mutual advice and consultation, there has been established a Central Co-operation Board at Manchester; the members connected with which hold congresses and conferences at different places.

For further information, we refer to the statutes; also to the "Co-operative News;" the reports of the above mentioned bodies; the annual sheet "Almanack of the Rochdale Equitable Pioneers;" the published "Transactions of the National Association for Promoting Social Science; and Chambers's "Information for the People," No. 85 "Social Economics." See likewise the article BENEFIT SOCIETIES.

CO-O'RDINATES. What is called the method of C. is an invention of Descartes, whereby algebra and the calculus may be employed in geometrical investigations. The method is sometimes called algebraical geometry—sometimes, and more properly, analytical geometry; and it is commonly treated under the heads "geometry of two dimensions," and geometry of three dimensions, according as it is applied to investigate the properties of figures all in one plane, or of curved surfaces. The method is capable of popular explanation. C. are lines so measured off from a fixed point, called the origin of C., along fixed lines passing through it, called the axis of C., as to determine by their quantities the position of any other point relative to the origin. The first step is to find how to determine the position of a point in a plane. Take any fixed point in it for the origin of C., and through it draw two fixed lines—the co-ordinate axes—at right angles to one another. Then, if the perpendicular distance of the point from each of these axes be given, its position will be determined.

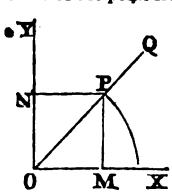

Fig I

Referring to Fig. 1, if P. be the point, and O be taken for the origin of C., OX, OY for the axes, then if we know NP or OM, the perpendicular distance of P from OY, and measure off from O, OM on the axis OX, and through M raise a line perpendicular to OX, P must lie in this line, for it contains all the points in the plane which are at the perpendicular distance OM from the axis OY. Similarly, if ON or PN, the perpendicular distance of P from the axis OX, be known, and we measure that distance off from O along OY, and through N draw a perpendicular to OY, the point must be in that perpendicular. It is therefore at the intersection of the perpendiculars through M and N respectively. When, as in the figure, the fixed lines are at right angles to one another, the C, OM, ON are called the rectangular C. of the point. Let us now see what use can be made of this mode of determining the position of the point, for the discovery of the properties of lines and surfaces. As the values of the C. change for the different points in the plane, they are denoted by the variables x and y. Now, if we suppose the point P to begin to move according to a determinate law, and the C. to change their magnitudes so as always to be its C., knowing the law of P's motion, we are able to express in algebraical language the law of the corresponding changes in its co-ordinates. For instance, if P moves so as to be always at the same distance from O, OP is constant and (47th Prop. Euclid, Book I.) the square on OP is equal to the sum of the squares on OM and PM. Putting this into algebraical language, we have the equation, $x_2 + y_2 = R_2$, or $y = \pm \sqrt{R^2 - x_2}$, where R = OP. This is called the equation of the circle referred to its centre as origin, and to rectangular C.; and it expresses the law according to which the changes of the C. must take place: and from this equation, combined with that to a straight line, &c., every property of the circle may be determined. If P move so that the sum of the distances from two fixed points shall be always the same, and we express the relation between x and y in that case, we should have the equation of an ellipse. This suffices to shew in a general way the nature of the method. Equations between x and y are called the equations of

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the lines, whether straight or curved, traced out by the point P; and by means of them, though they but express relations between *quantities*, the *qualities* of the lines to which they refer may, by artifices explained in every treatise on the subject, be detected. Nay, by assuming equations between x and y, and examining the lines which points represented by them would trace, many singular curves have been discovered. There are a variety of conditions to be attended to in the interpretation of such equations, depending on the assumptions set out with, in choosing the origin and axis. The axis of x or OX being taken to the right of the origin, and the axis of y or OY being perpendicular to it and above it, x and y are counted positive when they are measured along their axes to the right of and above the origin respectively, and negative when they are measured to the left and downwards respectively. Suppose $x = OM = ON$, and $y = MP = MP_1 = NP_2 = NP_3$, the C. of the points P, P_1, P_2, P_3 would be $(+x, +y)$, $(+x, -y)$, $(-x, +y)$, $(-x, -y)$ respectively. These points being equidistant from O, we may suppose a circle to pass through them. Recurring now to the equation of the circle, $y = +\sqrt{R_2 - x_2}$, the meaning will be seen of the two values + and − of y given by the quadratic. Often the axes of C. selected for convenience are oblique, i.e., inclined at some other angle than a right angle. An equation between C. referred to one set of axes may always be transformed to C. referred to another, by the process known as the transformation of co-ordinates. A similar transformation of equations by the same process may be made where it is desired to refer the line to a new origin.

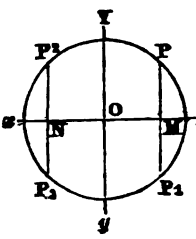

Fig 2

What has hitherto been said refers entirely to the C. of a point in a plane or to what is called geometry of two dimensions. But the rationale is the same with that of connecting in equations the C. of points in space—the subjects of geometry of three dimensions. The position of a point in space requires three C. to determine it, and these are usually denoted by the symbols x, y, z. An origin being taken, and three axes, OX, OY, OZ, mutually at right angles to one another, the point is referred to the three planes through these axes. z, or PN, is its height above the plane through YOX; y, or NM, is its distance perpendicularly from the plane XOZ; and x, or OM, is its perpendicular distance from the plane ZOY. It is clear that these three determine the position of the point. In three dimensions, as in two, the problem may be stated to be: Given the law of the motion of P, to express the law regulating the variations of its C. as it moves. The algebraic expression of the latter law is, the equation of the surface traced by the point in moving over all the space it can traverse consistently with the law of its motion. The method of C., besides its use in geometry; is of great value for resolving forces in mechanics, and also for finding the resultant of a great many of them.

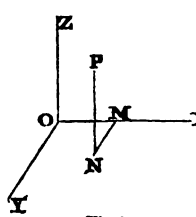

Fig 3

COORG, a province under the government of India, bounded by Mysore, Malabar, and Canara, is situated in lat. 11° 56′—12° 45′ n., long. 75° 25′—76° 15′ e. It contains about 2000 sq. miles, and in 1871, 168,312 inhabitants. Down to 1834, it was a native principality of ampler dimensions. As at present defined, C. appears to be wholly within the basin of the Cauvery, one of the chief tributaries of the Bay of Bengal. From its elevated situation—the lowest point is more than 3000 feet above the sea—C. is exposed to both the south-west and the north-east monsoons. Hence the yearly fall of rain amounts to about 120 inches. For the same reason, the temperature is comparatively low and equable. Nearly the whole of this rugged region is covered with forests more or less dense, but seldom so full of undergrowth as to form jungle. The zoology of C. comprises elephants, tigers, bears, &c., with birds

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and reptiles in vast variety. The natives, mostly Nairs, are handsome and athletic. Among them there exists a community of wives between brothers. But C. has perhaps nothing so worthy of notice as its artificial fortifications. The country is intersected by ramparts, which are from 15 to 25 feet in height, and by ditches of about 10 feet in depth and about 8 in width; while, being in some places double or triple, or even quadruple, they measure in aggregate length upwards of 500 miles. These works are very ancient. The true name of this territory is *Kudagu*, C. being a corrupt form.

COO'SY—not to be confounded with the much smaller Coosey which enters the Hoogly from the right below Calcutta—is one of the largest rivers of India. It rises in lat. 28° 25′ n., and long. 86° 11′ e., on the southern slope of the Himalayas, receiving, however, at least one affluent from the northern face of that range. On emerging from the mountains in lat. 26° 45′, and long. 87° 13′ it shews a greater volume than does the Ganges itself in the corresponding position of Hurdwar. After a course of 325 miles in all, through the state of Nepaul and the district of Purneah, it joins the Ganges from the left, in lat. 25° 19′, and long. 87° 19′.

COOT (*Fulica*), a genus of birds of the order *Grallæ*, either ranked in the family *Rallidæ* (rails, crakes, &c.), or in a separate family, *Lobipedidæ*, which differs chiefly in having the toes edged with a scolloped membrane, thus making an approach to the web-footed birds. Coots have a strong, straight, and somewhat conical bill, the base of which extends up the forehead and there dilates so as to form a remarkable naked patch. The tail is very short. They are aquatic in their habits, preferring lakes or pools with reedy margins, and retreating among the reeds on any alarm. The Common C. (*F. atra*) is found in most parts of Europe, Asia, and the north of Africa; occurring in the more northerly regions as a summer bird of passage, which is the case in the north of Scotland; although in the more southerly parts of Britain it is plentiful during winter. It is about sixteen inches long, of a black color, with a narrow white bar across the wings, and the naked patch on the forehead pure white, from which it is often called the Bald Coot It makes a large nest of water plants among reeds or rushes. Although not very highly esteemed for the table, the circumstance that many can be killed by a single shot, on the mud banks to which coots resort in winter, as on the south coast of England, makes C. shooting profitable to the fowlers who purvey for the market. The American C. (*F. Americana*), a very similar species, is found in all parts of North America, from the West Indies to the Saskatchewan.

COO'TEHILL, a town in the north-east of Cavan county, Ireland, on the Cotehill, an affluent of the Annalee, 23 west-north-west of Dundalk. It consists chiefly of four wide streets, and is situated at the west end of a series of lakes navigable for about 7 miles to the east to near Ballybay. It has a trade in linen. Pop. (1871) 1851.

CO'PAIS, Lake. See BŒOTIA.

COPAI'VA, or Copaiba, Balsam of, a valuable medicinal substance, consisting chiefly of a resin (*Resin of Copaiva*) and a volatile (*Oil of Copaiva*). It flows from incisions made in the stems of trees of the genus *Capaifera*, trees with pinnate leaves of the natural order *Leguminosæ* sub-order *Cæsalpinieæ*, natives of the tropical parts of America. It has a peculiar, not disagreeable odor, and an acrid taste. It has stimulant properties, is diuretic when taken in small doses, aperient in larger doses; but is principally useful from its powerful action on the mucous membranes. It is much used in affections of the urino-genital system, and is also employed in chronic catarrhs, &c. Balsam of C. is not unfrequently adulterated with castor oil. The Wood Oil (q. v.) or Gurgina Balsam of India, the produce of a species of *Dipterocarpus*, is sometimes sold in Britain as balsam of Copaiva.

CO'PAL, a resinous substance used for a variety of purposes in the arts. It appears in commerce in smooth rounded masses, colorless or lemon-yellow, translucent or transparent, rather brittle, and in a cold state, almost without smell or taste. It is readily fusible and inflammable, is insoluble in water, and only partially soluble in alcohol and oil of turpentine, but becomes entirely soluble in them when it has been for a short time melted. Various useful pale-yellow or almost colorless varnishes and lackers are made of melted C. and alcohol, oil of turpentine, or boiled linseed oil.

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C. is said to be a general Mexican name for resins or gums, and the C. of commerce was perhaps originally brought from Mexico. C. is also obtained in Africa, Brazil, Madagascar, and India. Mexican C. is now believed to be the produce of a species of *Hymenæa*, a tree of the natural order *Leguminosæ*, sub-order *Cæsalpinieæ*. *Vateria Indica*, a large tree of the natural order *Dipteraceæ*, yields the C. of India, very nearly resembling true C. in its properties, but also sometimes called Gum Animé (q. v.) in British commerce. A mineral substance resembling C., and therefore called *Fossil C.* or *Copaline*, is found in some places, as at Highgate, near London, from which it is called *Highgate Resin*.

COPA'LCHE BARK, a bark resembling Cascarilla Bark (q. v.) in its properties, and produced by shrubs of the same genus, *Croton pseudo-china* and *C. suberosum* (see CROTON), natives of Mexico. The former yields a variety in small quills; that produced by the latter is in larger quills, and has a corky epidermis. C. B. is much used as a substitute for *Cinchona* in the cure of intermittents in Mexico, and is imported, although not to a large extent, into Europe.

COPALM. See LIQUIDAMBAR.

COPA'N, a ruined city of Honduras, on the borders of Guatemala, in Central America. It stands on a stream of its own name, an affluent of the Motagua. The remains, extending about two miles along the river, comprise a temple of 624 feet in length, various pyramidal structures and sculptured idols similar to those of Egypt and India.

COPA'RCENARY. An estate in England originating in descent to two or more persons, called thence coparcenars or parcenars. It generally arises under the rule of law which makes the daughters of one dying without male heirs inherit equally, but it may also arise by local custom, as in the case of Gavelkind (q. v.). Although the property remains unsevered, yet each parcenar is entitled to a distinct share of it, and consequently there is no benefit of survivorship, but the right of each descends to his or her heirs, who are still called coparcenars with the surviving original parcenars. The rule of decent is also *per stirpes*, so that the heirs of one who has predeceased the common ancestor take only the share which would have come to their immediate ancestor had he or she survived, and thus a grandson of the common ancestor will also exclude his own sisters. If one of the coparcenars alienates his share, the C. is destroyed, and the estate becomes a tenancy in common (q. v.). C. may also be destroyed by partition, when the estates become in severalty (q. v.). This may be effected either by voluntary agreement, or by a suit in Chancery. Such parts of the property as cannot be divided (such as the manor-house, &c.), pass to the eldest sister or her issue, but an equivalent in value is assigned to the remaining sisters. An Advowson (q. v.) is exercised in turns, according to seniority. If the estates in C. are by descent reunited in one person, they become again an estate in severalty.

COPA'RTNERY. See PARTNERSHIP.

COPE, an ecclesiastical vestment, worn during the celebration of mass, at processions, vespers, and other solemnities. The C. was originally a cloak worn for ordinary purposes. In form it is a semi-circle, without sleeves and with a hood. It is fastened across the breast with a clasp or morse. Copes soon began to be ornamented with embroidery, and even with jewels; and so early as the 13th c. they became the most magnificent and costly of all the vestments of the priesthood.

COPE, a custom or tribute due to the crown, or lord of the soil, out of the lead-mines in Derbyshire.

COPE, Sir John, an English general of the first half of the 18th c., is known through his ignominious defeat at the battle of Prestonpans by the Highlanders, under Prince Charles Edward Stuart, September 21, 1745, and more widely through a sarcastic Jacobite song.

CO'PEC, a Russian coin, the oldest kind in Russia, and the first substitute for furs as a medium of exchange. The name is derived from the Russian word for a lance, St George and his lance having anciently figured on the coin. Copecs were originally coined of silver alone, but copper copecs were afterwards in-

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troduced. The present C. is the hundreth part of a silver ruble, which is worth 3s. 1½d. sterling.

COPENHA'GEN (Dan *Kjöbenhavn*, "Merchants' Haven"), the capital of Denmark, is situated on the island of Sjælland, in the Sound, which is here about 15 miles broad, and includes the island of Amager or Amak, which is separated from Sjælland by a narrow arm of the sea, forming a fine and capacious harbor. Lat. 55° 41′ n., long. 12° 35′ e. C. lies very low, and was strongly fortified until 1864, when the land-works were destroyed, although the citadel of Frederickshavn, and some of the batteries on the sea, were left in a condition to admit of being defended in case of emergency. The old ramparts of the city and citadel, which are planted with trees, afford pleasant walks. The population of C. was, in 1876, 233,000. Copenhagen proper, in Sjælland, and Christianshavn on Amager, which form the main divisions of the city, are united together by the bridges Langebro and Knippelsbro. The business quarter of C. stretches from its noble harbor in a n.-e. direction towards the principal and central square, Kongens Nyton, which in itself forms the focus of the life of the city. Further n. and e. of this point lies the aristocratic quarter, with the handsome Amalienborg Square of royal and administerial palaces; and this district is bounded in the extreme n. by the citadel, and the adjoining public gardens and walks on the shores of the Sound. C. has suffered so severely during the last century from the effects of fires and bombardments, that the city contains comparatively few remains of antiquity. Amongst its few buildings of historical interest or intrinsic beauty, we may instance the metropolitan cathedral-church, known as Vor Fruekirke, rebuilt after the bombardment of 1807, and distinguished now for possessing statues of Christ and the Apostles, together with a kneeling angel bearing a baptismal shell-font, which were designed, and in part executed, by Thorwaldsen himself. Trinitatiskirke, only remarkable for its round tower, which is ascended by a winding causeway instead of steps; and Holmens' Kirke, containing interesting monuments to the great naval heroes, Juel and Tordenkjold. The royal palace, called Christiansborg, is one of the most extensive in Europe, though its architectural character is not high. It contains, however, a picture gallery, and some noble works of art by Thorwaldsen, and others. The castle of Rosenborg, where the regalia are kept, contains interesting collections of objects of art; and the palace of Charlottenborg is now used as an academy of arts. The university was founded by Christian I. in 1479, but the constitution under which it at present exists bears date 1788. The number of professors amounts to about 50, and that of students to 1200. Connected with the university are a surgical academy, two observatories, a botanical garden, a polytechnic institution, and a library of 240,000 volumes, containing also a great collection of ancient Persian MSS., and another of ancient northern MSS. C. is the centre, not only of Danish, but of northern literature and art, and is the seat of a number of societies for the advancement of these in all their branches, amongst which the most important are the Literary and Scientific Association, founded in 1742: the Academy of Arts; and the Royal Society for Northern Antiquities, founded in 1825. The royal library contains 500,000 volumes, besides great treasures of Sanscrit and other MSS. The Museum of Northern Antiquities in Christiansborg is unrivalled in its kind, and contains an admirably arranged collection of *stone* weapons, ornaments, &c., to 500 B.C., bronzes to 500 A.D., and articles wrought in iron, silver, and gold to 1000 A.D., besides numerous specimens to illustrate arts and manufactures in Scandinavia during the Christian ages. The Thorwaldsen Museum, opened in 1846, consists of works of art by that sculptor himself, and others left by him to the Danish nation, for which a separate building has been erected. C. contains also a number of well-supported benevolent institutions. Since the war of 1864, C. has rapidly recovered its commercial activity, and now its trade is steadily increasing. In 1874, C. possessed 393 ships of 63,118 tons, while between 8000 and 9000 vessels annually enter its port. Leather, wool, grain, and oils are its staple commodities. Its royal porcelain works have long enjoyed a European reputation, but besides these and a few manufactories for gloves, glass, &c., C. has no branches of industry worthy of any special notice in this article.

About the middle of the 12th c., C. was an insignificant fishing-village, in the neighborhood of which Bishop Axel, or Absalon, built a castle. He bequeathed the castle, village, and neighboring district to the bishopric of Roeskilde. In 1254, the village obtained the privileges of a town, and in 1443 King Christopher made it the

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capital of the kingdom. It was several times attacked by the Hanseatic League; was besieged and bombarded by the Swedes in the 17th c.; suffered grievously by fires in 1728, 1794, and 1795; witnessed a great sea-fight in its roads on 2d April 1801, when the English, under Sir Hyde Parker, with Nelson as his second in command, were victorious over the Danish fleet; and was bombarded by the English from the 2d to the 5th of September 1807, when great destruction was wrought, both in houses and public buildings, and about 2000 persons lost their lives.

COPERNICAN SYSTEM, The, is that which represents the sun to be at rest in the centre, and the earth and planets to move round it in ellipses; in other words, it is that which we now know, on unquestionable evidence, to be the true system of the world. It got its name from Copernicus, but, in point of fact, it may be described as being a growth to which he was only one of many contributors. The merit of having first formed the general notion of the system seems to be due to Pythagoras; Copernicus has the credit of having, after the lapse of centuries, again drawn the attention of philosophers to it, and of having greatly increased the probability of its truth by his calculations and arguments; for the rest, the glory of having matured its idea belongs to Kepler, Galileo, and others, and to our own Newton, who, through the discovery of the law of gravitation, demonstrated its truth effectually. Many who have been used to reverence the name of Copernicus in connection with this system, would be surprised to find, on perusing his work "De Revolutionibus Orbium," how much of error, unsound reasoning, and happy conjecture combined to secure for him in all times the association of the system with his name.

"De Revolutionibus Orbium," dedicated to Pope Paul III., consists of six books, in which Copernicus undertook to demonstrate his whole system. The character of the reasoning which then passed for demonstration, must be borne in mind in judging of the author's procedure in establishing his various positions. It was then thought a sufficient demonstration of a phenomenon to make a supposition, on which its occurrence would be intelligible, without attempting to bring the supposition itself, by an induction of facts, within the truth of nature; many abstract propositions, too, which would not appear to be simply silly, were at that time universally admitted to be of great weight in scientific arguments.

Illustrations of both of these peculiarities may be gleaned from the first of the six books of "De Revolutionibus." It contains the following propositions: 1. That the universe is spherical. This is established by such arguments, as that the sphere is the most perfect figure, &c. 2. That the earth is spherical, which flows from the same kind of considerations. 3. That the earth and sea make one globe. 4. That the motions of all the heavenly bodies must be uniform and circular or compounded of uniform and circular motions. Here, again, we meet with singular reasons. A *simple* body must move circularly, and nothing but circular motion could give periodicity to phenomena. 5. That, supposing the distance of the stars to be immense, there is no reason why the earth should not have a motion round its axis as well as a motion in its orbit. 6. That the sphere of the stars is immensely distant. The proof is fanciful, and shews he had no notion of a universe of stars prevading space. 7 and 8. The ancients were wrong in placing the earth at the centre of the universe. The arguments under this head are as imaginary as those which they were designed to refute. The falling of a body to the earth he deduces from the assumption, that it is only given to wholes to move circularly, while it is of the nature of parts, separated from their wholes, to move in right lines. That there must be a *centrum mundi*, an entity unknown to modern science, is admitted, the question being as to its position. 9. It is possible for the earth to have several motions. 10. He establishes the order of the planets, and draws a diagram of the system much as it is now represented. It may be observed that, following the old systems, such as the Ptolemaic, he lays down *a sphere* for the fixed stars. (See FIRMAMENT.) It is clear, also, that he had no idea of the motions of planets other than that they were such as would be caused by their being fixed in immense crystal spheres revolving round the sun.

The most brilliant and valuable part of the "De Revolutionibus" is that in which he explained, for the first time, the variations of the seasons, the precession of the equinoxes, and the stations and retrogradations of the planets. In general, his explanations are right, and perfect as to the general nature of the causes of the phenomena. But Copernicus had neither mathematical nor mechanical knowledge suf-

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ficient to enable him to explain more than the mean motions of the solar system. To account for irregularities, he was obliged to introduce a system of epicycles entirely resembling that of Ptolemy. See PTOLEMAIC SYSTEM. This arose from the false notion of his times, that all motions must be compounded of circular ones, with the application of which idea, and with the invention of convenient epicycles, the greater part of the "De Revolutionibus" is occupied. It may further be added, to rectify the vulgar notion regarding the relation of Copernicus to the system of the heavens, that he had no answer to offer to the mechanical objections to his system. Most of them, indeed, were such as could not possibly be met in the then state of mechanical knowledge. One of the commonest was that against the axial motion of the earth, that it was inconsistent with the fact of bodies falling to the points of the earth directly beneath the points from which they are dropped; for this he had no answer, nor could he have, the laws of motion being not yet discovered. Such being the state of the case, the reader will consider whether, when Copernicus wrote that he held the doctrine of the earth's motion as a mere hypothesis, and not as absolutely in fact true, it is more likely that he made a concession to the religious prejudices of his times, or to difficulties surrounding his hypothesis, which he could well appreciate though not overcome.

COPERNI'CIA. See CARNAUBA PALM.

COPE'RNICUS, Nicolas, an eminent astronomer, was born at Thorn, in Prussia, 19th February 1473. He was instructed in the Latin and Greek languages at home; afterwards he was sent to the university of Cracow, where he studied philosophy and mathematics, and took the degree of doctor of medicine. He also studied law at Bologna university. His natural bent, however, was towards mathematics, the study of which he pursued with passion through all its branches.

Having become enamored of the study of astronomy, he projected a journey to Rome in his enthusiastic admiration of Regiomontanus, who resided there, and was then the most illustrious of the astronomers. On his arrival he was kindly received by Regiomontanus, whom he soon rivalled in fame. Here his reputation, and the favor of his distinguished friend, led to his being chosen professor of mathematics, which he taught for several years most successfully. After several years he left Rome and returned to his native country, where, having entered into holy orders we suppose, he obtained through his uncle, the Bishop of Warmia, a canonry at Frauenburg, in the enjoyment of which he passed the rest of his life. His working-day, it is said, he divided into three parts—one devoted to the duties of his office, another to giving medical advice gratuitously to the poor, and the third to study.

Soon after his return to Prussia, he began, in his 35th year (1507), to apply his fund of observations and mathematical knowledge to correcting the system of astronomy which then prevailed. The result was his "De Revolutionibus Orbium," some account of which is given in the previous article. He completed it in 1530, in his 57th year. But though finished at this date, it was twelve years later before he could be persuaded to give his book to the world by his friends, who urged its publication out of regard at once to his fame and the interests of science. Perhaps the strongest motive for his reticence, was the fear of the unpopularity which the work threatened to bring him (for many who had heard of the views it advocated, doubted if these were in harmony with religion), while it is pretty certain that his desire to conciliate the church (which afterwards shewed in the case of Galileo what it was capable of in such a matter), led him to dedicate his book, when it was published, to Pope Paul III. It is related that the first copy of this labor of his life reached him when he was no longer able to enjoy the triumph. An attack of dysentery, followed by paralysis of the right side, had destroyed his memory and obscured his understanding. In this state he lingered several days. The copy, it is said, just arrived a few hours before he died. It was placed in his hands, and he *seemed* to know it! He died 24th May 1543, aged 70.

Besides the "De Revolutionibus," may be mentioned among C.'s works a treatise on Trigonometry, entitled "De Lateribus et Angulis Triangulorum," Wittemberg, 1522, 4to; and "Theophylactici Scholastici Simocattæ Epistolæ Morales, Rurales, et Amatoriæ, cum Versione Latina." He also wrote a work on money, and several MS. treatises from his pen are said to be in the library of the bishopric of

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Warmia. His life has been written by Gassendi, an almost literal translation of whose work will be found in Martin's "Biographia Philosophica."

COPIAPO', a name of various application in the north of Chili, marking at once a volcano, a river, a district, a village, and a city. 1. The volcano is a peak of the Andes, in lat. 27° 32' s. 2. The river has a westerly course of 120 miles from the Andes to the Pacific; its mouth being in lat. 27° 20' s., and long. 71° 3' w. 3. The district, sometimes reckoned a part of the province of Coquimbo, is rich in silver and copper; but, excepting on the immediate banks of streams, almost valueless for agricultural purposes. 4. The village, known as Port C., stands at the mouth of the river, containing about 1200 inhabitants. 5. The city built on the river, about 80 miles from the sea, had in 1875 a population of 11,432. It is connected by railway with Caldera, a harbor of the republic, about 20 miles to the north of the mouth of the river. The C. Railway has 120 miles in operation. The shares owned by British subjects amount to the sum of 1,500,000 dollars. The exports from this region are copper, silver, cobalt ore, and hides. The imports are almost wholly from the United kingdom, consisting of coals, iron, bricks, machinery, &c. There is also some trade across the Cordilliera with the Argentine Provinces.

CO'PLAND, James, a distinguished physican, born at Deerness, in the Orkneys, in 1792. After studying medicine, at Edinburgh, he travelled on the continent, and subsequently undertook a journey to Africa, to investigate the nature of epidemic diseases prevalent in tropical lands. He settled in London about 1820, and was made a member of the Royal College of Physicians. In 1822, he undertook the editorship of the "London Medical Repository;" and being chosen in that year to deliver the annual oration of the London Medical Association, he in his lecture advanced a new theory of electro-galvanism. His "Outlines of Pathology and Practical Medicine," in which he especially treated of the ganglionic nerves and their functions, and proposed a new and more simple classification of diseases, appeared in 1822, and the "Elements of Physiology" in 1824. But C.'s most important work was the "Dictionary of Practical Medicine," four closely printed volumes, to which he devoted the labor of many years. This comprehensive work has attained an extensive reputation in America and Germany as well as in England. The views given in his essay on "Pestilential Cholera," published in 1832, when the cholera first appeared in Britain, have been confirmed by experience. He also published, besides various contributions to medical periodicals, a treatise on Palsy and Apoplexy, and, in connection with Dr Annesley, one "On the Diseases of Warm Climates." He died in 1870.

CO'PLEY, John Singleton, the father of the late Lord Lyndhurst, and a historical painter of some note, was born at Boston in the United States, July 3, 1737. In 1774 he came to England, and after a visit to Italy, settled permanently in London. In 1783 he was elected a member of the Royal Academy, and died in 1815. C.'s best work is the "Death of Lord Chatham," now in the national collection. Besides it, may be mentioned his "King Charles Ordering the Arrest of the Five Members of Parliament," the "Death of Major Pierson," the "Assassination of Buckingham," and "King Charles Signing Stratford's Death Warrant."

CO'PPER is one of the most anciently known metals, and its name is derived from the island of Cyprus, where it was first obtained by the Greeks. In the earlier times, C. does not appear to have been employed by itself, but always in admixture with other metals, principally tin, forming what is now called bronze (q. v.). There is every reason to believe, that next to the large quantities of tin which they obtained, one of the great inducements which the Phœnicians had in making searches for metals in Great Britain, was the C. which they procured in their workings in Cornwall.

C. is sometimes met with in nature in a state of purity, but generally it is associated with oxygen, water, and carbonic acid, forming the native carbonate of C. or *malachite* ($CuO,HO + CuO,CO_2$), or with iron and sulphur, forming the ative sulphurets of C. and iron or *C. pyrites* (Cu_2S,Fe_2S_3). In smaller quantity, C. occurs as the oxide (CuO), and sulphate ($CuOSO_3$), and in all cases the ore is obtained from fissures or veins in other rocks. The principal yield of C. ore in Great Britain is from the mines in Cornwall, but large supplies are also obtained from Australia, and from Cuba and Chili in South America. In North America, in the neighborhood

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of Lake Superior, C. ore occurs abundantly, and a vein of metallic C. is there found which in some places is about two feet in thickness.

In the extraction of C. from its ores, the metallurgic processes followed are very tedious and complicated, which mainly arises from the difficulty of separating the iron and sulphur from the copper. The general principle which regulates the working-up of the ore is to burn away the sulphur (S) as sulphurous acid (SO_2), and to carry off the iron by means of fluxes in the form of scoriæ or slag. Metallurgists enumerate ten distinct steps in the production of commercially pure copper.

C. (symb. Cu, from Lat. *cuprum*) has the equiv. 31·7—new system, 63·4. It is the only red metal, has the specific gravity 8·78 when cast, and 8·96 when rolled or hammered; fuses at 1996° F. (Daniell), and at a white heat passes off in vapor, and burns with a green flame. It is very malleable, and can thus be beaten out into thin leaves; is very ductile, so as to admit of being drawn out into thin wires; and its tenacity is only inferior to that of iron. It is a powerful conductor of electricity, and hence is employed in the construction of lightning-conductors, and in telegraph-wires for underground or submarine communication. C. is also employed largely in the sheathing of wooden vessels, and in the coinage. See also ALLOY.

C. forms many compounds. There are two oxides, the black oxide (CuO) and the red oxide (Cu_2O). The latter is employed in coloring glass of a ruby-red tint. The *green rust* which forms on the surface of a C.-sheathed ship, and on C. coins and vessels which lie in moist places for some time, is a carbonate of C., and is due to the carbonic acid and oxygen of the air acting upon the C. in the presence of moisture. It is very poisonous, and hence any barnacles which may attach themselves to the C. sheathing are poisoned. The carbonate of C. under the name of *blue verditer*, is largely prepared and sold as a pigment. The subchloride of C. moistened and exposed to the air, yields the pigment known as *Brunswick green*. There are several compounds obtained by allowing acetic acid to act upon oxide of C., which are commercially called *blue* and *green verdigris*. The sulphate of C., or *blue vitriol* (CuO,So_3+5HO), is prepared by dissolving the black oxide in sulphuric acid, and allowing the salt to crystallise out. The crystals are large, and present a fine blue color. It is soluble in water, and is extensively used by the dyer and calico-printer for the production of several blue and green colors. The solution of blue vitriol is also employed in the preservation of timber from dry rot, and it forms a constituent of some writing inks.

Mineralogy.—Native C. is not of very rare occurrence; it is sometimes massive or in grains, plates, &c.; sometimes crystallised in cubes or octahedrons; sometimes it assumes dendritic and other beautiful forms. Great masses of native C. have been found both in North and South America. What are called C. ores in commerce, generally consist of the true ore disseminated through rock, and are therefore very variable in productiveness. A C. schist is profitably wrought at Mansfeldt in Germany, although it yields only one per cent. of copper. Among the most plentiful and valuable C. ores is the *C. Pyrites* already mentioned, or *Yellow C. Ore;* but there is a richer ore called *Purple C.* or *Variegated C.*, or *Bornite*, also a compound of sulphur, C., and iron. *Malachite* and *Azurite*, both consisting essentially of carbonate of C., are valuable ores; as are some ores which are essentially composed of oxygen and C., particularly *Red C. Ore* (*Cuprite*) and *Black C. Ore* (*Tenorite*). Some ores of C. contain also silver, and some contain arsenic, antimony, &c. *Gray C. Ore* is very compound, containing silver, mercury, zinc, antimony, arsenic, iron and sulphur. *Atacamite*, wrought as an ore of C. in South America, is composed of chloride of C. and hydrochlorate of copper.

COPPER INDIGO is an ore of copper found in spheroidal masses, of an indigo blue color, in Thuringia and Vesuvius, and is very nearly pure sulphuret of copper. Its composition in 100 parts, is copper, 64¼; sulphur, 32¾; iron, ½; and lead, 1.

COPPERAS is the commercial term for the sulphate of iron. See IRON.

COPPERED, Coppering, in Ship-building, are terms used in reference to the sheathing applied to the bottom of timber-built ships. The copper so used is in sheets, weighing from 18 to 32 ounces per square foot, and usually measuring 48 inches by 14. A layer of felt, paper, or coarse linen, is first applied to the planking; and the copper is nailed down upon it. So much of the bottom as is immersed in the water is thus covered. The timbers are by this means protected from molluscs,

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cirrhopods, and weeds; and consequently the ship can sail quicker than if no such sheathing were applied. Some builders copper their ships up to the load water-line, while others go no higher than the light-load line; there being a difference of opinion whether the intermediate space, sometimes dry and sometimes wet, ought to expose a wood or a copper surface.

A *copper-bottomed* ship always ranks better at Lloyd's than one not so sheathed. The same is the case with a ship said to be *copper-fastened*; i. e., in which bolts of copper are used instead of iron in those parts of the ship immersed in water. Ships can be insured at a lower premium when thus provided.

CO'PPERMINE RIVER—so named, in common with the mountains to the west of it, from the metallic products of the vicinity—enters a bay of the Arctic Ocean about lat. 68° n., and long. 116° w. Its overland discovery by Lieutenant Hearne, then of the Hudson's Bay Company's service, in June 1771, excited considerable interest, as incontestably proving that the supposed Strait of Anian, whatever might be the truth as to its westward terminus, had its eastward outlet, if any, only in the Icy Sea. The C.R. rises near a feeder of Great Bear Lake, which itself is tributary to the Mackenzie—the former of the diverging water-courses taking a vastly shorter route to the coast than the latter. Hence the C.R. is throughout little better than a series of falls and torrents, being thus, even without regard to its isolated position, but little available in itself, for navigation.

CO'PPERPLATE PRINTING. See ENGRAVING.

CO'PRA, the dried kernel of the cocoa-nut, from which cocoa-nut oil has been expressed. It is much used in India as an ingredient of curries.

CO'PROLITES (from Gr. *kopros*, dung, and *lithos*, a stone), are the fossilised excrements of animals found in the Secondary and Tertiary strata of the earth's crust. Their true nature was first inferred from their occurrence in the bodies of several species of *Ichthyosaurus*, in the region where was situated the intestinal tube. It has been since shewn that they are the voidings chiefly of saurians and of sauroid fishes. They often contain portions of scales, bone, teeth, and shells, the indigestible parts of the food on which the animals lived. Occasionally they may be found exhibiting the spiral twisting and other marks produced by the conformation of the intestinal tube, similar to what is noticed in the excrement of some living fishes. These peculiar markings obtained for them the name, when their true nature was unknown, of "larch-cones" and "bezoar-stones." C. are found to contain a large quantity of phosphate of lime; and as this forms a valuable manure, the deposits containing them have been of late years largely quarried by the manufacturers of artificial manures.

COPS, Coping (Anglo-Sax. *cop*, Ger. *kopf*, the head). The merlons or rising parts of battlements are sometimes called cops, but the term coping is usually applied to the covering course of a wall, which is made either sloping or round, so as to throw off water. Where the coping is of hewn stone, it is frequently ornamented with a circular moulding running along the top, and sometimes the angle at the top is simply taken off, to prevent it from being chipped.

COPSE, or Co'ppice, a natural wood or plantation, of which the trees are cut over from time to time, without being allowed to attain the size of timber trees, sending up new shoots from their roots or stools. Some kinds of trees—as the firs—are incapable of being treated in this manner, refusing to send up new shoots; but many—as the oak, birch, chestnut, ash, elm, maple, alder, hazel, and willow—very readily do so, at least if they have not been allowed to attain too considerable a size before being cut over. C.-woods are sometimes planted chiefly to vary and beautify the landscape, but more generally with a view to profit, either owing to great local demand for their produce, or to peculiarities of soil and situation. It often happens, that owing to scantiness of soil or to unfavorable subsoil, oaks and other trees, after growing vigorously for a number of years, are arrested, and remain almost stationary in their growth. In such circumstances, it is advantageous to cut them over early, and to treat the plantation as a C., the former vigor being again manifested in the young shoots, and the land yielding in this way a greater return to its owner. Oak is much planted as C.-wood, in consequence of the demand for its bark; in some parts of Herefordshire, the trees are cut over every

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twelve years; but in the Highlands of Scotland, twenty-five or thirty years are often necessary for sufficient growth, nor is the bark thought to have attained its highest perfection till the stems are of this age. The largest pieces of the wood are used for making wheel-spokes, and for other purposes of timber; the smaller portions for charcoal, and firewood. Ash is sometimes planted as C., with a view to the employment of the wood for handles of implements, hurdles, hoops, &c., the wood of the ash, even when very young, being highly valued for strength and elasticity. Chestnut copses are planted in England to supply hop-poles. Hazel is a very common C.-wood, being in great demand for making crates, &c. Besides the cultivation of different kinds of willow or osier for basket-making in which they are cut over annually, some of the species are cultivated as C., and cut every five, six, or seven years, for hoops, crates, &c.; the species which is deemed most suitable of all being *Salix caprea*. See WILLOW. In some countries, C-wood is particularly valued for the regular supply of fuel which it affords.

In cutting C.-wood, care is taken to dress the stools so that water may not lodge in them and cause them to rot. The size to which the stems are allowed to attain before being cut, and the frequency of cutting, differ according to the different kinds, and the uses intended. Stems more than four inches thick are generally cut with the saw, but smaller stems with a curved bill, cutting upwards. Extensive copses are sometimes divided into portions, of which one is cut every year.

CO'PTIS, a genus of plants of the natural order *Ranunculaceæ*. *C. trifolíata* is a native of the north of Europe, Siberia, Greenland, Iceland, and North America. It grows in swamps. From its long, thread-like, golden-yellow rhizomes, it derives the name of *Golden Thread*. Its leaves have three wedge-shaped leaflets, and its leafless stems bear each a solitary, rather pretty white flower. Very similar to the *C. trifoliata*, is *C. teeta*, the *Golden Thread* of Assam, the root of which has long been in high repute in Assam and neighboring countries. It has come into extensive use in India as a bitter tonic, and is sold at a very high price. Great efficacy is ascribed to it as a tonic for patients beginning to recover, but it is of no value as a febrifuge.

COPTS, the Christian descendants of the ancient Egyptians. Various derivations have been given of the name, which, however, is most probably from the same root as *E-gypt*. The C. are in number about 150,000, only about a fourteenth of the population of the country. There are about 10,000 of them in Cairo. They are not of great stature, have black eyes, and rather curly hair, and in a number of points resemble the ancient Egyptians, from whom also they have inherited the custom of circumcision. They dress like the Moslems, but are generally distinguished by a black turban. Their character is in general gloomy, deceitful, and avaricious. They are very expert in calculations, and are therefore much employed as accountants and book-keepers, by which they have acquired great influence in the country, filling very important posts. In religion they are generally monophysites (q. v.) of the Jacobite sect; smaller sections of them, however, are united to the Greek and Roman Catholic churches. They ascribe their conversion from heathenism to St Mark, whom they regard as the first patriarch of Alexandria. Their highest dignitary is the patriarch of Alexandria, whose residence, however, is in Cairo. Their other orders of clergy are bishops, archpriests, priests, deacons, and monks. The patriarch is named by his predecessor from among the monks of the convent of St Anthony, or chosen from among them by lot. He is not permitted to marry. He nominates the Metropolitan of Abyssinia. See ABYSSINIA. There are twelve bishops. The C. are very strict in their religious observances, and hate other Christian sects even more than they hate the Moslems. They baptise by immersion; practice unction, exorcism, and auricular confession; and celebrate the Lord's Supper with leavened bread which has been dipped in wine. They keep Friday with great strictness as a fast-day. They have many schools, but only for boys, who learn the Psalms, Gospels, and Apostolic Epistles in Arabic, and then the Gospels and Epistles in Coptic. The Coptic, however, is not grammatically taught, and is not now a spoken language, having been everywhere supplanted by the Arabic. It has not been spoken in Lower Egypt since the 10th c., but lingered for some centuries longer in Upper Egypt. It is, however, still used by the C. in their religious services, but the les-

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sons, after being read in Coptic, are explained in Arabic. The Coptic literature consists in great part of lives of saints and homilies, with a few Gnostic works. The alphabet was borrowed from the Greeks at the time of the introduction of Christianity, with the addition of a few letters. There are two principal dialects of the language—the Sahidic or Upper Egyptian, and the Memphitic or Lower Egyptian, which is sometimes exclusively called Coptic. A third dialect, the Bashmuric, of which only a few remains exist, was spoken in the Delta, and is interesting from its points of resemblance to the language of the hierogiyphics.

CO'PULA (Lat. band) is a term employed in Logic to designate the word which unites the two notions of a sentence—viz, the subject and predicate into one judgment or thought. Thus, in the sentence, "Art is long," *art* is the subject, *long* the predicate, and *is* the copula. The C. is either expressed apart by some part of the verb "to be," as in the above sentence, or it is contained in the word expressing the predicate—as, "The flower blooms"—i. e., *is* blooming.

CO'PY, in the Fine Arts, is a reproduction of a work, whether painting, statue, or engraving, not by the original artist. A C. made by the master himself is called a repetition (in French a *doublette*). It is said that copies are of three degrees: first, where the original is mechanically imitated in its minutest details (this is always done when an engraving is to be obtained); second, where only the principal traits are imitated; and, third, where the general idea merely is borrowed. A C. of a statue, or other piece of sculpture, taken from a mould, is not called a C., but a *Cast* (q. v.).

CO'PYHOLD, a species of estate or right of property in land, in Ireland and England, nearly resembling in many particulars the feu-rights of Scotland. C. is expressed technically as "tenure by copy of court-roll, at the will of the lord, according to the custom of the manor." This means, that it is tenure of land, being part of a manor, the title being evidenced by the court-rolls of the manor, and the right of the owner being in conformity with the immemorial customs of the manor. The addition, "at the will of the lord," serves only as a memorial of the derivation of this species of estate from the estates granted in old times to the bondsmen, or *Villeins* (q. v.), which were of course resumable at the pleasure of the lord. But the will of the lord is now absolutely controlled by the custom of the manor, which forms the law of the tenure; and as this custom must be immemorial, i. e., extending to the reign of Richard II., no C. can now be created.

The custom of each manor may vary in important particulars. In some, C. lands are held for life only; in some, they descend according to particular rules of their own; in most, however, they descend according to the ordinary rules of succession. But the custom, whatever it may be, cannot be altered by the holder of the C.; he cannot, for instance, entail his land unless the custom warrants him.

An important point, also dependent entirely upon special custom, is the amount of the money-payments due by the copyholder to the lord of the manor. These are divided into the *rents*, an annual payment of the nature of the Scottish feu-duty; *fines*, payments on particular occasions, such as alienation or succession; and *heriots*, or the best piece of personal property, to which, on the death of the copyholder, the lord becomes entitled. As to fines, it may be observed, that the custom may either fix the amount, or it may leave them to be at the pleasure of the lord; but as the courts of law require that all customs, even when indefinite, shall be reasonable, they have fixed the extreme amount that can be exacted at two years' rent of the land.

One practical distinction of much importance, drawn between freehold and C. land, is the mode in which it must be conveyed. An ordinary conveyance is ineffectual in regard to C., and indeed would operate, like other attempts to break through the custom which forms the title, as a forfeiture. The course adopted is almost identical with the Scottish *resignation*. The owner comes to the steward of the manor, and by a symbolical delivery, according as the custom may prescribe, surrenders the land to the lord of the manor, in order that it may be granted again to such person, and on such terms as are desired, and as the custom authorises. The steward, by a repetition of the symbolical delivery, transfers the C. to the person in question, in terms of the surrender; and he then pays the customary fine, and takes the oath of fealty. This is called conveyance by surrender and admittance. In the case of an

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heir succeeding, there is no surrender, but there is admittance only upon payment of the customary fine, and it is enforced by a customary penalty. A mortgage is effected by a surrender, upon condition that the money is repaid, and the admittance takes place only in the event of failure of payment. A C. may, in like manner, be devised by will, the devisee being admitted on the death of the devisor. A comparison between C. and the Scotch feu will be found in Paterson's "Compendium of English and Scotch Law," p. 57.

The inconveniences and loss accruing through the variety of customs to which C. lands are subject, have led the legislature to make provision for their gradual extinction. By the copyhold commissioners, all the services due to the lord of the manor may be commuted for a fixed rent. The lord of every manor is also authorised to enfranchise, or convert into freehold, the C. lands by agreement with their owners. And after the next admittance subsequent to 1st July 1853, either the lord or the tenant so admitted may compel enfranchisement on payment, either of a fixed sum, where it is at the instance of the lord, or of an annual rent, where it is at the instance of the tenant, fixed in both cases by the commissioners.

COPYING, a term applied in Photography to the reproduction of paintings, engravings, manuscripts, maps, &c. The kinds of camera and lens most suitable for the purpose, will be found described under their respective heads; the quality and condition of chemicals necessary are based upon the facts, that long exposure is almost invariably required, and that, in the majority of cases, it is desired to copy black marks upon a white ground, as in a sheet of music, for example. Where it is obvious that nothing that can be called a middle tint is required, but simply pure black and white, recourse should be had to organic matter in the bath; a little acetate of soda, and an extra amount of acetic acid, may be also added, and an old collodion containing free iodine employed.

It is important that the work or surface to be copied should be placed in a strong light, and exactly at right angles to the axis of the lens, which should be furnished with a *small* stop. These three conditions, it will be seen, are such as are calculated to insure density in the blacks of the negative, freedom from distortion, and sharpness at the edges of the picture. The copying of oil paintings seems to the amateur at first sight to present almost insuperable difficulties, on account of the reflected light from the varnish passing through the lens and producing black patches on the negative. This may however be completely avoided by the employment of a lens of long focus, which admits of the oblique pencils of light passing off without entering the camera.

Attention to the laws of the reflection of light will suggest to the reader the importance also of avoiding a bright light immediately behind the camera, as the rays of light would then fall on the varnished surface nearly at right angles, and be reflected into the camera. The oil painting, therefore, though placed in strong sunshine for the purpose of giving vigor to the more obscure parts, should be so arranged as to allow the light to fall on it at an angle of about 35° or 40°.

In copying transparent negatives a somewhat different arrangement is required, as will appear from considering the following facts. Every object to be copied may be regarded, for the sake of illustration, as an assemblage of bright points, from each of which divergent pencils of rays are reflected, and suffer refraction on passing through the lens; an engraving or oil painting is in fact, in its relation to the sensitive surface, the *source of light*. In a negative, however, many of the parts of which are transparent glass, it is manifest the case is, different, for if we suppose the sun or a luminous background to be placed behind the negative, *that* will act as the source of light, and any rays coming therefrom will pass almost directly through those parts of the negative which are bare glass, to the lens; thus producing the same effect as if the transparent parts were opaque, but luminous and emitted divergent pencils of light. It is necessary therefore that the rays should be made to intersect at those points where bare glass exists, and this may be accomplished by employing what is called a condensing lens, by which means negatives may be most successfully copied by placing an artificial light behind it, or still better, by reflected sunshine through it.

Negatives are sometimes copied on glass by direct superposition in the ordinary pressure-frame, such as is used for printing photographs on paper, in which case,

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dry plates are used, prepared either by the albumen or collodio-albumen process; and the latent image so obtained yields a transparent positive when developed by gallic or pyro-gallic acid.

COPYING MACHINES. The various contrivances for procuring duplicates of writings without the labor of transcribing them, may be reduced to two classes. In the one, the writing is first made, and then copied; in the other, the copy and the original are produced at the same time. The essence of the first method is this:—In writing the original, an ink is used that is made for the purpose, or common ink thickened by the addition of a little sugar. When the writing is dry, a damped sheet of thin unsized paper is laid upon it, and over this a piece of oiled paper. The whole is then subjected to pressure, and the damped paper is found to have taken off an impression of the writing. It is of course the reverse of the original, but the nature of the paper allows it to be read right on the other side. The machines for communicating the pressure are of various kinds. Some pass the sheets between rollers like the copper-plate press; others act on the principle of the common printing-press. A simple plan is to wrap the sheets rounds a wooden roller of about an inch diameter, lay this upon a table, and roll it under a flat board, pressing all the while. Another very common method of copying, is by means of prepared blackened paper laid between two sheets of thin writing-paper. The writing is traced firmly on the upper sheet, with a steel or agate point, or common black-lead pencil, and the lines are found transferred in black from the blackened sheet to the paper adjacent. By having several of these blackened leaves, a number of copies may be produced at once. The blackened paper is prepared by saturating it with a mixture of lard and lampblack, and cleaning it so far that it will not soil paper unless pressed against it.

COPYRIGHT, an author's exclusive right of property in any work which he writes, and which, under certain limitations, is transferable to his heirs and assigns. Such is the chief or general meaning of the term, which now, however, embraces several varieties of right; and these, from the importance of the subject, we propose to consider separately.

Books.—The idea of a right of property in literary composition is of modern origin. Nothing is heard of C. previous to the invention of printing, nor for a long time afterwards. In ancient and mediæval times, books appear to have been transcribed freely by other parties than their authors, and as freely disposed of, often at great prices. After the introduction of printing, the liberty to publish books became the subject of licenses and patents; and these privileges may be said to have constituted a special monopoly of the nature of copyright. In the absence of any license or protection of this kind, authors could only resort to the common law to vindicate their real or fancied rights. But the common law of England was silent on the subject. There were serious differences of opinion among lawyers as to the availableness of an exclusive right in literary composition, viewing it as a chattel or thing that could be held, inherited, or assigned. How, it was asked, could ideas, or the way of writing a narrative, be made property? Supposing, however, that a certain structure of ideas and written words could be invested with the quality of property, it was reasonable to conclude that the property should be absolute and perpetual to the owner, his heirs and successors. Such being the case, it would be proper for the heirs of Shakspeare, Milton, Bunyan, and other literary luminaries of past times, to claim possession of the works of their respective ancestors; leaving them, of course, the right either to maintain a monopoly, or to suppress the works altogether. Such were the questions that puzzled the English jurists of the early part of the 18th c. A compromise appears to have been made. No decision was come to, as to whether literary composition was property in the ordinary sense of the word. Yet, looking at it as a thing on which thought and labor had been expended, and professedly "for the encouragement of learning," it was deemed worthy of legal protection for at least a period limited by considerations of public policy. An act of parliament was accordingly passed on the subject in 1709.*

* Until this act came into operation, the law of Scotland, as regards copyright, had been as defective as that of England. Under date November 9, 1699, the following occurs in the "Domestic Annals of Scotland," by R. Chambers, vol. iii.: "It was customary for the Lords of Privy Council to grant exclusive right to print and vend books for certain terms—being all that then existed as equivalent to our

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This, the first C. act, 8 Anne, c. 19, sets out as follows: "Whereas printers, booksellers, and other persons have of late frequently taken the liberty of printing, reprinting, and publishing, or causing to be printed, reprinted, and published, books and other writings, without the consent of the authors or proprietors of such books and writings, to their very great detriment, and too often to the ruin of them and their families; for preventing, therefore, such practices for the future, and for the encouragement of learned men to compose and write useful books, may it," &c. The chief provisions of the act were, (1.) That authors who, after April 10, 1710, had not sold their C. of works in print, were to have the sole right of printing them for 21 years; (2.) Authors of books not printed and published, and their assignee or assigns, to have the sole liberty of printing and reprinting such book and books for the term of 14 years, to commence from the day of the first publishing the same; (3.) After the expiration of the said term of 14 years, the sole right of printing or disposing of copies to return to the authors, if they were then living, for another term of 14 years.

Under this act, authors disposed of the C. of their works for the specified period, at the end of which, 28 years at most, the C. lapsed. Although the works might then have been considered public property, a custom arose among publishers of not interfering with each other's lapsed copyrights; and in a sense each assumed a kind of perpetual monopoly of the works which he had purchased for a terminable period. So stood matters, when Alexander Donaldson, an Edinburgh bookseller, of whom some notice has been taken in the article BOOK-TRADE, broke through the conventional regulations, by issuing cheap reprints of works out of copyright. There ensued a litigation, of which it is necessary to present some details. At divers times in 1729, James Thompson sold the C. of his "Seasons" and other poems to Andrew Millar, a London bookseller, for sums amounting to £242, 10s. Thompson died in 1748. According to the Act 8 Anne c. 19, the utmost length to which the C. of these works could be extended was 28 years, which terminated in 1757. Millar died in 1768, and his executors, in 1769, sold by auction the C. of the works in question for £505. The purchasers were "Beckett and others." This sale was, in reality, an imposition; for, as just mentioned, the C. had expired in 1757. Aware of this fact, Donaldson, in 1768, issued a cheap edition of Thompson's "Seasons." He was now challenged for an invasion of C.; and in 1771, Beckett and others applied for, and procured, an injunction from the Court of Chancery to restrain him from further printing and selling the work, and to make him answerable for the profits he had already realised. The only explanation of this extraordinary proceeding is, that the applicants for the injunction imagined that at common law they had acquired a property in Thompson's "Seasons" in all time coming. The question at issue was nothing less than the creation of perpetual monopolies in literature—not for the benefit of authors and their families, but for certain publishers and their assigns. The notion of a common-law right had prevailed in granting the injunction, and the validity of such a notion was now for ever to be determined. Donaldson appealed to the House of Lords. The chief points pressed for consideration were, whether at common law an author had the sole right of printing his works, and whether, possessing a right of that kind, it was taken away by the statute 8 Anne, c. 19. The Lords differed in their opinion, but the decision finally come to was, that any right at common law was impeached and taken away by the statute; and the decree of the Court of Chancery was accordingly reversed. See Brown's "Parliamentary Cases," vol. ii., p. 136. By this

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modern idea of copyright. Most generally, this right was given to booksellers and printers, and bore reference rather to the mercantile venture involved in the expense of producing the book, than to any idea of a reward for authorcraft. Quite in conformity with this old view of literary rights, the Council now conferred on George Mossman, stationer in Edinburgh, 'warrant to print and sell the works of the learned Mr George Buchanan, in one volume in folio, or by parts in lesser volumes,' and discharged 'all others to print, import, or sell, the whole or any part of the said Mr George his works in any volume or character, for the space of nineteen years.'" Some other instances of the same kind are given, making it clear that in these times books could not be printed in Scotland without authority from the Privy Council.

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famed decision, it was settled that claims of C. rest altogether on the statute and its interpretations. Ever since, any one is at liberty to print and sell works of which the statutory term of C. has expired; on the simple ground, that all such works are public property.

The C. law did not extend to Ireland till after the union with that country, when (1801) the whole United Kingdom was included by the Act 41 Geo. III. c. 107. Previous to this time, many of the most saleable of the British C. works were freely reprinted in Dublin, and occasionally found their way across the channel to the annoyance of English authors and publishers. The next act concerning copyrights was that of 54 Geo. III. c. 156, in 1814, by which the period of C., instead of being 14 years, and contingently for 14 years more, was fixed to be 28 years certain, and for the residue of an author's life, if he were living at the end of the 28 years.

The impetus given to literature during the early part of the present century, by the popular and voluminous writings of Scott, Byron, Moore, Wordsworth, and others, along with the growing taste for reading among the middle and less affluent classes, greatly increased the market value of C. in every species of literary production. As a natural consequence, that kind of disinterestedness so strikingly demonstrated in Robert Burns, who could hardly be prevailed on to acccept a few pounds complimentarily in requital for hundreds of the most beautiful lyrics, was no longer seen; on the contrary, it became a recognised principle that an author was entitled to regard the product of his brain as purely a mercantile commodity. At length, under an impulse communicated by the assigns of some valuable copyrights about to expire, and on the assumption of benefiting the families of certain popular writers, the legislature was induced to extend the term of copyright.

By the Act 5 and 6 Vict. c. 45, called Talfourd's or Lord Mahon's act, 1st July 1842, the term of C. was extended as follows: "And be it enacted that the copyright in every book which shall after the passing of this act be published in the lifetime of its author shall endure for the natural life of such author, and for the further term of seven years, commencing at the time of his death, and shall be the property of such author and his assigns; provided always, that if the said term of seven years shall expire before the end of 42 years from the first publication of such book, the copyright shall in that case endure for such period of 42 years; and that the copyright in every book which shall be published after the death of its author shall endure for the term of 42 years from the first publication thereof, and shall be the property of the proprietor of the author's manuscript from which such books shall be first published, and his assigns." In the case of subsisting copyrights, the term was to be extended to 42 years, except when they belonged to an assignee for other consideration than natural love and affection; in which case they were to cease at the expiration of the 28 years, unless their extension were agreed to between the proprietor and the author. In this act, there is a remarkable clause giving power to the Judicial Committee of the Privy Council to license the publication of books of importance which the proprietor refuses to republish after the death of the author. Formerly there was an obligation on publishers to deliver 11 copies of new works to certain universities and other public institutions; the obligations was now modified to 5 copies. The importation of English C. works printed in foreign countries is prohibited. C. is declared to be personal property, and may be bequeathed as such; in case of intestacy, it is to be subject to the same law of distribution as other personal or moveable estate. The old obligation to register the C. of new works at Stationers' Hall was also modified; registration is no longer obligatory, but the practice of registering is still requisite for the sake of evidence in making good claims of copyright. Forms of registration and assignment are given by the act, but the use of them is not indispensable. The law of C. makes no distinction between British subjects and aliens. A foreigner may own the C. of a work printed first in Great Britain; but neither he nor any other person could maintain a claim of C. in a work which had been previously issued in a foreign country with which there is no international treaty of copyright. Attempts are sometimes made to evade this, by issuing editions of a work simultaneously in the United States and England on the same day, so as to secure both British and American copyrights.

The ordinary process of stopping the issue of unauthorised reprints of C. works, which receive the name of pirated editions, consists, in the first place, in procuring

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an injunction from the Court of Chancery (if in Scotland, an interdict from the Court of Session), and of afterwards raising an action of damages at common law. On all that concerns prosecution, as well as for many details respecting C. in its different varieties, we refer to Godson and Burke's "Treatise on the Law of Copyright."

Such is the history and general nature of the law of C. respecting books. The last-mentioned act, more explicit than previous statutes, remains the great charter on the subject. Unfortunately, it still leaves some defects which it would require a fresh law to remedy. The extension of C. for the assumed benefit of authors and their families, which is the leading feature of the act, must be pronounced generally worthless. In the great majority of cases, authors assign the C. of their manuscripts for a consideration to publishers, who, looking for remuneration within a reasonable length of time, cannot, and as a rule do not, give a higher price for a 42 than for a 28 years' copyright. The tendency of Talfourd's act is still more than ever to lock up copyrights in the hands of the original assigns, where they are apt to become torpid and useless. A remedy for this evil has lately been found in a practice followed by certain acute and enterprising publishers of cheap reprints. Buying up the unexpired copyrights of books which have gone somewhat out of notice, they issue them in a form suitable to the nature of their business; and such reanimated productions constitute no small share of the cheap volumes that invite public attention—the author and his heirs being not in the slightest degree benefited by the process of literary resurrection.

Extracts, Abridgments, &c.—C. in a book entitles the proprietor to prevent extracts being made from it; but in practice, short extracts for the purpose of criticism, as in reviews, or for historical illustration, are tolerated. Unauthorised abridgments of C. works are deemed piracies, and their sale can be stopped. In such cases, however, the abridgment must shew a clear adoption of the language or collocation of words of the original. It is now determined that no C. can be maintained in mere subject, information, or ideas. A writer may have put himself to great trouble to procure information on a particular subject; but the law does not recognise how information is procured. If a second writer use the information of the first (though that may have little regard to matters of fact), and make out of it a new work, there is no invasion of C. unless the words of the first have been at the same time taken. See preface to Napier's "Memoirs of Dundee."

Encyclopædias, Periodicals, &c.—The C. of articles contributed for and included in encyclopædias, magazines, reviews, or other periodical works, and of books published in a series, was regulated by the Act 5 and 6 Vict. c. 45. The C. of such articles, being paid for and assigned, belongs to the publisher, but he cannot publish them separately without the consent of the author. The author, however, may reserve the right of separate publication, and merely sell the right to use the article; but, should he republish any such article or articles, it may only be done in such a manner as not to prejudice the right of the original publisher.

Dramatic Pieces and Musical Compositions.—These with right of representation and performance are, by the Act 5 and 6 Vict. c. 45, subject to the same C. as books. Strictly, a C. song cannot be publicly sung, or a tune publicly played, without the permission of the composer or his assigns. Verses must not be taken from a periodical or copyright work and set to music, for sale, without permission. A C. work of fiction may be dramatised without the consent of the proprietor, who has no statutory power to forbid the performance.

Lectures and Public Addresses remain the C. of the person delivering them. By 5 and 6 William IV. c. 65, printers and publishers are liable to a penalty for printing and issuing spoken addresses without the consent of the author. It is understood that no one is at liberty to take down a sermon as delivered by a clergyman, and publish it without permission; the act, however (§ 5), makes some exceptions; protection is not extended "to any lecture or lectures delivered in any university, or public school, or college, or in any public foundation, or by any individual in virtue of, or according to any gift, endowment or foundation." Under this permissive clause it would appear that sermons delivered by clergymen of the Established churches, in endowed places of public worship, are deemed public property.

Letters and every kind of epistolary correspondence are the property of the writer. The receiver of a letter may retain it for his own use, but strictly, he cannot publish

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it without the permission of the sender or his heirs, neither can he sell it as a curiosity. The sale of letters of distinguished individuals is illegal, though ordinarily tolerated. See *Curtis* on the law of C., pp. 87, 89 et seq., and cases there quoted. As to the rule in this respect in Scotland, see the proceedings in the case of the "Scotch Thistle" newspaper, in Irvine's report of the trial of Madeleine Smith, pp. 93 and 305.

Newspaper matter is subject to the common law of C., but practically, and for mutual convenience, the intelligence in one paper is freely copied by the more respectable class of papers with, and in the less respectable without, acknowledgement. The taking of leading articles in the same manner might doubtless be checked; as would also be the unauthorised adoption of existing newspaper titles.

Engravings, Maps, Charts.—C. in these is secured by several acts, more particularly the 17 Geo. III. c. 57. The term of C. is 28 years. Each engraving or map must have on it the date of publication and name of publisher. Those who infringe C., forfeit the plates on which the pirated engravings or maps were printed; they forfeit also every pirated sheet, and five shillings for every print undisposed of. There is no C. in subject. Any one may invent or delineate and sell pictures from subjects in C. books, without challenge. It is understood that in painting a portrait, C. remains with the artist, although he be paid for the picture, and the purchaser cannot take copies without permission or assignment. C. as to paintings, however, is ill defined and defective, and an improved law on the subject is said to be under consideration. See DESIGN, under which head is also noticed the C. of models, sculptures, casts, patterns of carpets and paper-hangings, &c.

Copyright in the Colonies.—By the Act 5 and 6 Vict. c. 45, the C. of books, &c., printed in the United Kingdom, is extended to all British colonies; and the Act 8 and 9 Vict. c. 93, concerning the trade of the colonies, absolutely prohibited these dependencies from importing pirated editions of C. works. Practically, this last recited act was unavailing. Large quantities of cheap reprints of British C. books continued to be imported from the United States into the British American possessions. Remonstrances against these irregularities at length led to some special legislation. It was ordained by the Act 10 and 11 Vict. c. 95, that the colonies might respectively enact a law to enable them to import pirated C. works, on the plan of exacting a custom-house duty on such works, the proceeds to be handed to the proprietors of the said copyrights. Colonial laws were accordingly enacted, in nearly all the British colonies except Australia. But the provisions were found quite inadequate. In 1874 the Dominion of Canada passed an act, confirmed by the Imperial Parliament in 1875 (c. 53), for securing in Canada the rights of authors, and for prohibiting the importation into Canada of any work for which copyright under the colonial act had been secured. By this act, if there is copyright in the United Kingdom in a book, the author becomes entitled to copyright also in Canada, and none but the owner can import into the United Kingdom any copies reprinted in Canada. A copyright for 28 years from the recording thereof is now secured in Canada to authors; and if the author, or his wife or child, is living at the end thereof, then, for 14 years longer, such copyright being recorded there with the Minister of Agriculture.

Copyright in the United States is well defined. The latest act of congress on the subject is that of the year 1870. C. can be secured by any citizen of the United States or resident therein, who is the author of any book map, chart, dramatic or musical composition, engraving, cut, print, photograph, painting, statue, &c. The term of C. is 28 years from date of recording; but at the end of that term, the author, if living, or, if dead, his widow or child, may record C. for an additional term of 14 years. In cases of renewal, record to be published in one or more newspapers. The first step in securing C. is to send a copy of the title of the book or other article, or a description of the painting, statue, &c., to the librarian of congress before publication and two copies of the book (a photograph in the case of paintings, &c.) must be sent to the librarian within ten days after publication. The librarian makes the proper record, receiving a small fee. It is requisite that notice of entry of C. be stated in each book or on each other article. All pirated copies of C. works are to be forfeited, independently of claims for damages by action at law.

Copyright in Germany was first regulated as respects duration by the Confederation; a resolution of which, in 1837, fixed the duration of property in literary

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productions and works of art at 10 years: and another resolution in 1845, extended it to the lifetime of the author, and for 30 years after his death. The laws regulating the contract of an author with his publisher varied in the different states. In Prussia, when an author assigned a C. to a publisher without any special stipulation, the publisher was entitled to issue only one edition, the extent of which he might determine. But a distinction is made between reprints or new issues (*auflagen*) and new editions (*ausgaben*). In the case of the former, the publisher is left free, on condition that he shall pay to the author, should no agreement be come to between them, on the occasion of each new issue, half the sum which he paid him for the first. New editions, on the contrary, can be published by the first publisher only by entering into a new contract with the author, which must be given in writing. This privilege is limited to the author's life, though his children have a claim for a *honorarium* for each edition issued after his death. The rights of the publisher may be transferred, and those of the author descend to his heirs. When the rights which have been conveyed to the publisher terminate, the author becomes again the unlimited proprietor of the work. Copyright in Germany is now regulated by imperial legislation. By the *Reich's Verfassung* of 16th April 1871 (Art. 4), the protection of "intellectual property" (*der Shutz des geistigen Eigenthums*) was expressly included in the matters which were to be dealt with by the Imperial Parliament.

Copyright in France exists in the author and in his widow for life, in his children for twenty years, and in his other heirs or assignees for ten years after his own death or that of his widow. In *Belgium* the same law prevails, with this exception, that the right, whether in children or in other representatives, extends to twenty years after death.

International Copyright is a mutual convention between two countries to protect each other's copyright, translations included. The United Kingdom made such arrangement with Spain, Austria, Belgium, Saxony, Prussia, France, Italy, &c. The United States have ever refused to enter into any international law of C. with Great Britain; a circumstance, as is understood, imputable chiefly to the opposition of the leading publishers of pirated editions of British C. works.

The late Right Hon. James Wilson contemplated a consolidation of the C. laws, and such a measure is certainly very desirable. Amongst improvements required may be cited the following: 1. An improved system of registration. As matters are now conducted at the Stationers' Hall, any person may make any entry he pleases, with very little check in case of false pretension. A reform in this particular should embrace a system of registration in Edinburgh, and also in Dublin, as well as in London, for the convenience of the three sections of the United Kingdom; the registrar of each section to get copies annually of the other registers for general inspection. 2. A clearer understanding of the posture of articles contributed to periodicals, encyclopædias, &c. It would probably answer the main purposes of justice, if the proprietor of the work contributed to were held as having, by his stipulated payment, acquired the C., unless where a special reservation was made. 3. A protection to publishers for literary services paid under a salary. It is clearly absurd to expect that each particular article, or, say, addition to a formerly existing book, written in these circumstances, should be matter of formal assignment; and in practice no such assignment takes place. Yet, with authors disposed to take advantages, there may be cases in which the honorable understanding as to the sufficiency of salary may be no protection to the publisher from at least a harassing litigation. 4. A remedy for the great mistake made in Talfourd's act, in the extension of copyright. By making this extension only to the representatives of authors who had not parted with their copyrights, the real objects of the act would be secured, and an additional inducement to prudence on the part of literary men would be established. See BOOK-TRADE. W. C.

COQUEREL, Athanase Laurent Charles, a minister of the Reformed Church in Paris, and one of the most celebrated pulpit orators of France. He was born in Paris in 1795, and studied theology at Montauban. Afterwards, he became minister of the French church in Amsterdam, where he remained twelve years. In 1830, Cuvier induced him to return to Paris, where, till his death, he held the office of a preacher of the gospel. In 1848, he was elected a delegate to the National Assembly, by the department of the Seine, but he did not appear to much advantage either

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in this Assembly, or in the Legislative Assembly, of which he was also a member. He wrote many works on religious subjects, history, and literature, all of which are marked by an earnest and liberal spirit. By the more rigidly orthodox of his co-religionists, C. was regarded as a heretic. He died 20th January, 1868.—His son, Athanase Josué Laurent, also a Protestant pastor of liberal tendencies, died in 1875.

COQUI'LLA NUT, the fruit of a palm, *Attalea funifera*. See ATTALEA. It now forms an article of export from South America, being used to a considerable extent in Britain in the manufacture of buttons and in turnery, as for making knobs of walking sticks, umbrella handles, handles of bell-pulls, &c. It is very hard, susceptible of a good polish, and beautifully mottled with dark and light brown. The demand for coquilla nuts seems likely to increase; and probably the fruits of some other palms may be found suitable for similar purposes.

COQUI'MBO, the name of a river, department, and city of Chili.—1. The river rising in the Andes, enters the Pacific about lat. 29° 56' s., and long. 71° 25' w., and forms at its mouth, one of the best harbors in the republic.—2. The department, extending in lat. from 25° 30' to 31° s., and in long. from 69° to 72° w., occupies the entire breadth of the country between Aconcagua on the south and Atacama on the north. With the exception of the immediate banks of streams, it is parched and barren, being valuable chiefly for its mines of silver and copper. Physically, the region here and there presents galleries of shingle-terraces with organic remains. See CHILI. The population in 1875 was 157,463.—3. The city stands at the entrance of the river, and contains about 6000 inhabitants. In addition to copper and silver, it largely exports chinchilla skins. The copper exported in 1873 amounted to 15,000 tons of the value of £1,125,000. It goes mainly to England.

COQUI'TO (*Jubæa spectabilis*), a beautiful Chilian palm, of the same tribe with the cocoa-nut, rising with a naked stem to the height of 40 or 50 feet, and bearing a crown of wide-spreading pinnated leaves. By cutting off the crown, the sap is obtained in great quantity, continuing to flow for months; and when boiled down to the consistence of treacle, becomes a very sweet syrup, and forms, under the name of Palm-honey (*miel de palma*), an article of great importance in the domestic economy of the Chilians.

COR ANGLOIS, a wind-instrument of the reed species, the body of which is bent in the form of part of a circle. It is just a large oboe, and played on by oboe-players. Its compass is from F, fourth line in the bass, to B flat above the treble staff. Music for this instrument is written a fifth above the real tones.

COR CA'ROLI. See CONSTELLATION.

CO'RA, Co'ré, or Co'ri, a town of South Italy, 30 miles south-east of Rome. It is most picturesquely situated on a commanding elevation in the midst of olive-plantations, and crowned by the ruins of ancient temples. Two torrents dashing through deep ravines on the east and west side of the hill add romance to the situation. The town, divided into an upper and lower part by an olive-grove, is surrounded by walls, chiefly of 15th c. date, and is on the whole well built, clean, and healthy, with a population of 6000. C. preserves the name, and occupies the site, of one of the oldest cities in Italy. Virgil and Diodorus make it an Alban colony, while Pliny ascribes to it a Pelasgic origin. In any case, it was early one of the most important cities of Latium. The ancient remains still existing—including those of the old walls, a Doric temple called the *Temple of Hercules*, a Corinthian temple, consecrated to Castor and Pollux, and a fine bridge—are among the most interesting in Italy.

CORA'CIAS. See ROLLER.

CO'RACLE. See CURRACHS.

CO'RACOID BONES. In the mammalian skeleton, the scapula or blade-bone presents a projecting bony process termed the Coracoid Process, from its supposed resemblance to a crow's beak (Lat. *kŏrax*, a crow); and from the idea that the bones which we are now describing, and which exist in all birds, in saurian and chelonian reptiles, and in the monotremata, correspond anatomically with the comparatively

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slightly developed coracoid process, they have received the name which is now universally assigned to them.

As the uses of these bones are most obvious in birds, we shall confine our remarks to this class of animals. It is obviously necessary that the scapular arch should be very strong in birds, in order to form a solid resisting fulcrum to the powerful movements of the humerus and other wing-bones. The scapula is a long, curved, compressed bone, extending along the back on each side of the dorsal vertebræ, imbedded in the muscles to which it gives attachment, while at its fixed extremity it assists in forming the cavity of the shoulder-joint. The coracoid-bone is the great support of the shoulder; for while at one extremity it sustains the wing, at the other it is firmly secured to the sternum by a broad and strong articulation; indeed, it forms the main resistance to the approximation of the humerus to the median plane, and retains it firmly in its lateral position. The scapula and coracoid bone are anchylosed (or united by osseous matter) at their point of union, thus forming collectively the structure popularly known as the side-bone. The clavicles, which are conjoined to form the furcula, combine to add to the stability of the whole apparatus.

CORA'IS, Adamantios, called by the French Coray, one of the most learned Hellenists of modern times, and a great benefactor of his nation, was born at Smyrna on 27th April 1748. His father was a merchant, and he for some time also engaged in mercantile pursuits; but having from his earliest youth delighted in the study of ancient and modern languages, he relinquished business, and devoted himself to literature. He fixed his residence in Paris, and there continued to reside till his death on 6th April 1833. He published editions of many ancient Greek authors, adding notes and prolegomena, in which his patriotic zeal was often very strongly displayed. He translated into modern Greek the work of Beccaria, "Del Delitti e delle Pene;" and by various translations and other publications, exercised a great influence in awakening the minds of his countrymen. When the Grecian war of independence began, C. was too aged to take any active part in it, but by his writings he shewed his sympathy with the cause of his country.

CO'RAL, a calcareous secretion or deposit of many kinds of Zoophytes (q. v.) of the class *Anthozoa*, which assumes very various and often beautiful forms, according to the different laws which govern the gemmation of the polypes of the different species. The C.-producing zoophytes are compound animals, which increase by gemmation, young polype buds springing from the original polype, sometimes indifferently from any part of its surface, sometimes only from its upper circumference, or from its base, and not separating from it, but remaining in the same spot, even when the original or parent polype, has ceased to exist, and producing buds in their turn. The calcareous deposition begins when the zoophyte is still a simple polype —owing its existence to oviparous reproduction—adhering to a rock or other substance, to which the calcareous matter becomes affixed, and on which the C. grows or is built up, the hard deposits of former generations forming the base to which those of their progeny are attached. One layer of the calcareous polype cells of which the greater number of corals are composed, occasionally surrounds another like the concentric circles in the wood of exogenous trees; one layer is sometimes deposited above another; the whole structure sometimes branches like a shrub, spreads like a fan, or assumes the form of a cup, a flower, or a mushroom. Under the common name C. are included many species, also designated Madrepores (q. v.), and some have received other names derived from peculiarities of their form and appearance, as Brainstone C. (q. v.), &c. In the greater number of kinds, besides the calcareous plates which form and separate the polype cells, and which are variously arranged according to the form and structure of the polypes themselves, there is a more solid internal or central calcareous part, formed by the additional deposition of calcareous matter at the bottom of each polype cell, or from the common living part in which the polypes are united. The calcareous framework is further strengthened by a greater or less mixture of horny animal matter with the pure calcareous substance. This calcareous framework is analogous to the cartilaginous, leathery, or fibrous framework of many other compound zoophytes, as *Alcyonium* (q. v.) or *Dead Man's Fingers*. The polypes of the common RED C. (*Corallium rubrum*) indeed very much resemble those of *Alcyonium*; but the central axis in this and other corals forming the family *Corallidæ* is

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quite solid, being produced in concentric layers by the living gelatinous substance, which envelopes it like the bark of a tree, and from which the polypes project like buds, or, when their tentacula are expanded, like little flowers. In the *Madreporidæ*, the general structure more nearly resembles that of *Alcyonium*. Many of them, however, have the whole calcareous framework covered as in the *Corallidæ*, by a gelatinous living substance which unites all the polypes. The whole living part soon decomposes and disappears, when the C. is taken out of the water; in some species, almost immediately running from the calcareous part as a watery slime.

Corals chiefly abound in the seas of the warmer latitudes, where they form extensive banks at no very great depth, and their various and bright colors present the appearance of submarine flower-gardens. Numerous species are usually combined in the formation of a single C. reef, and respectively occupy different places in it. Corals of the branching genus *Porites* usually occupy the exposed edge of the reef, and with them is associated *Millepora Complanata*, a species which forms thick vertical plates, united at different angles by their edges, the outer plates only being tenanted by living polypes. In the stiller water within are many more delicate kinds, and in the quiet sheltered depths, brainstone corals and flower-like forms appear

The C. of commerce, or common RED C.—so much admired for its fine color, susceptible of a high polish, and much used for ornamental purposes—is chiefly obtained from the Mediterranean, in some parts of which extensive "coral fisheries" are carried on. It is brought up from considerable depths by means of a sort of grappling apparatus dragged after a boat or boats; the pieces being broken from the bottom by beams of wood which are sunk by weights, and then entangled among hemp. Red C. has a shrub-like branching form, and grows to the height of about one foot, with a thickness like that of the little finger. Much of the C. of the Mediterranean is exported to India, but Red C. is also obtained in the Red Sea, the Persian Gulf, &c.—BLACK C. (*Antipathes*), the axis of which is rendered still more solid by the greater mixture of horny with calcareous matter, is still more highly prized.—C. was known to the ancients, and was used for ornamental purposes by the Gauls.

CORAL FLOWER, or Coral Tree (*Erythrina*), a genus of trees and shrubs, of the natural order *Leguminosæ*, sub-order *Papilionaceæ*; of which the species, natives of tropical and sub-tropical regions, generally produce long spikes of beautiful flowers of a rich dull crimson or a scarlet color, resembling coral. The leaves have three leaflets. The *standard* of the flower is remarkably long. The C. F. of Brazil (*E. crista galli*) is common in British green-houses. The Indian C. F. (*E. Indica*) is used in the East Indies for hedges, its stem being covered with thorns. The wood is so light and spongy that it is used for the largest sizes of corks.—*Jatropha multifida*, a very different plant, of the natural order *Euphorbiaceæ*, has also acquired the name of Coral Tree.

CORAL ISLANDS exist most abundantly in the tropical and sub-tropical parts of the Pacific Ocean. The formation of coral goes on, in favorable circumstances, with wonderful rapidity, for masses of coral have been found to increase in height several feet in a few months; and a channel cut in the reef surrounding a coral island, to permit the passage of a schooner, has been choked up with coral in ten years. It was at one time supposed that the coral polypes began their labors at the bottom of the ocean, and reared their pile from its greatest depths; but it has been ascertained that none of them live at depths of more than twenty or thirty fathoms, and most of them are inhabitants of much shallower water. It appears therefore, that the foundation of their still marvellous structures must be on rocks that do not reach the surface, probably in most cases volcanic rocks similar to those which, being further upheaved, form the volcanic and often mountainous islands of Polynesia. Around these volcanic islands, which—although some of them are the largest islands of the Pacific Ocean—are far fewer in number than its C. I., a fringing reef of coral is often found immediately attached to the land; whilst in many other cases, the reef surrounds the island, the intervening space—of irregular, but nowhere of great width—forming a lagoon or channel of still water, protected by the reef from winds and waves. According to a theory proposed by Mr Darwin, and now very generally accepted, this latter kind of reef is formed from a reef of the former or merely fringing kind, by the gradual subsidence of the rocky basis carrying down the fringe of

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coral to a greater depth; whilst the greatest activity of life is displayed by polypes of the kinds most productive of large masses of coral in the outer parts which are most exposed to the waves. In this manner also he accounts for the formation of true C. I., or *atolls*, which consist merely of a narrow reef of coral surrounding a central lagoon; and very often of a narrow reef—perhaps half a mile in breadth—clothed with luxuriant vegetation, bordered by a narrow beach of snowy whiteness, and forming an arc, the convexity of which is towards the prevailing wind, whilst a straight line of reef not generally rising above the reach of the tide, forms the chord of the arc. There is generally a navigable passage through the reef into the enclosed lagoon, the waters of which are still and beautifully transparent, and the depth of water close to the precipitous sides of the reef is almost always very great. The passages through the reefs surrounding the larger volcanic islands are often opposite to the mouths of steams; but even where this not the case, there is a strong current in these channels from the flux and reflux of the tides. Islets bearing a few cocoa-nut trees often appear at intervals in the line of a low coral reef, and very generally mark the sides of passages through it. When a reef has reached the surface of the water, sand, shells, fragments of coral and other substances, begin to accumulate, and cocoa-nut trees often grow where the waves still wash their roots. Further accumulations from the ocean with decayed leaves, stems, &c., gradually convert the reef into fertile land. Many C. I., of considerable extent and population, are nowhere more than a few feet above the level of the sea. Sometimes a volcanic upheaval seems to have taken place after the coral was formed, and this is supposed to have been the origin of the islands—comparatively few in number—called *Crystal Islands*, composed of coral rock, more or less modified by the action of air, water, and other agents. Islands of this class sometimes rise to an elevation of 500 feet, and often exhibit precipitous cliffs, and contain extensive caverns. They do not exhibit, however, the picturesque beauty of the volcanic islands, nor the soft and gentle loveliness which often characterises the true C. I., and which has received the enthusiastic praise of all voyagers in the south seas.

Coral reefs sometimes include within their circuit more islands than one. Reefs also sometimes extend to a great length in a straight line, generally parallel to a coast, the submergence of which they are supposed to indicate. There is such a reef on the east coast of New Holland, extending not less than 350 miles, without being broken by a channel.

CORAL RAG, a group of the Oxford or Middle Oolite (q. v.), consisting of continuous beds of petrified corals of very variable thickness, interstratified with beds of oolitic limestone. These strata occur in the northern districts of Berkshire and Wilts, and again, with the same characteristics, in Yorkshire, while in the intermediate district the whole group seems to disappear. It attains to a maximum thickness of 190 feet. The corals retain the position in which they grew at the bottom of the sea; they sometimes form masses fifteen feet thick. The characteristic genera are *Isastræa*, *Thamnastræa*, and *Thecosmilia*. With them are associated the remains of mollusca and echinodermata.

CORAL SEA, so called from the substance of its numerous reefs, is that section of the Pacific which stretches between Australia on the west and the New Hebrides on the east. Its general depth must be very considerable, for soundings of 2150 fathoms, or nearly 2½ miles, have been obtained in lat. 13° s., and long. 162° e.

CORALLINE (*Corallina* and *Corallinaceæ*), a genus and family of marine *Algæ*, of the sub-order *Ceramiaceæ*, remarkable for rigidity, which is mostly owing to a calcareous incrustation. When the calcareous matter is removed by a weak acid, the resemblance to other *Ceramiaceæ* becomes very apparent. The common C. (*C. officinalis*), extremely abundant on the British coasts, at first appears as a thin, round, shelly, purplish patch, on a smooth rock, the shell of a mollusc, or the frond of a sea-weed, gradually enlarges, and usually sends up a frond of jointed branching filaments, in a bushy tuft, an object of great beauty in the rock-pools. Although, as its name imports, this C. was once *officinal*, it has no medicinal virtues. Some of the corallines expand into leafy lobes, usually fan-shaped. Corallines are most abundant in tropical seas, and there display their greatest beauty.

The name C. is often popularly given to zoophytes of the class *Anthozoa*, and genera *Sertularia*, *Thuiarea*, *Antennularia*, *Plumularia*, *Laomedea*, *Campanularia*,

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&c., having branching polypidoms and hydraform polypes, of which the British coasts produce many small but extremely beautiful species.

CO'RANACH, CORANICH, CRONACH, &c., a funeral dirge, formerly in use among the Irish and Scottish Celts. The word is probably derived from the Gaelic *corrh-rànaich*, a crying together. "The cries (coranich) are called by the Irish the Ulagohne and Hululu, two words extremely expressive of the sound uttered on these occasions (funerals); and being of Celtic stock, etymologists would swear to be the origin of the *ololugon* of the Greeks, and *ululatus* of the Latins."—Pennant's "Tour."

The C. seems to be identical with the Irish *caóine*, generally written and pronounced *keen*, a dirge for the dead, "according to certain loud and mournful notes and verses," wherein the pedigree, property, the good and great deeds of the deceased, and the manner of his death are recounted, in order to excite sorrow or revenge in the hearers, and to shew them the loss they have sustained.

The word, in one or other of its forms, occurs in the writings of many of the ancient Scottish authors:

"Cryand for you the cairfull corrinoch."
Sir D. Lindsay.

"Cryand the corynoch on hie."
Battle of Harlaw.

"Be he the correnoch had done shout."
Dunbar.

The C. has long since fallen into disuse among the Highlanders. The funeral lament performed on the bagpipes, which may be considered as an instrumental C., lingered on till the latter half of the 18th century.

For specimens of C., see Sir Walter Scott's "Lady of the Lake," and accompanying notes; Crofton Croker's "Researches in the South of Ireland;" and "Blackwood's Magazine," vols. xiii. and xxiii.

CORA'TO, a large town in Southern Italy, province of Bari, 25 miles west of Bari, is situated on a fertile plain, where much cattle is reared. Pop. (1872) 26,220. It is an ugly, dirty town, although it boasts of having been founded by the Normans. It has a fine church, fine convents, and an orphan asylum. It was between C. and Andria that the famous "Challenge or Tournament of Barletta" took place between 13 Italians and 13 Frenchmen on February 13, 1503, in which the Italians were victors.

CO'RBEL (Fr. *corbeille*, a basket). In architecture, this term, adhering originally to its etymological meaning, signified an ornament in the form of a basket, like those sometimes set on the heads of caryatides. In Gothic architecture, to which it is now almost peculiar, it is applied to any kind of ornamented projection used for supporting pillars or other superincumbent weights. Here also its form probably was at first that of a basket projecting from the wall, in which the end of the pillar was placed, and on which it rested. Latterly, the more ordinary form was that of a head, with the face looking outwards or downwards. In this form it is found in all the styles. A recumbent animal, again, is sometimes placed under the pillar, and there are a great variety of other forms. When any construction is carried out, so as to rest on corbels, and to project beyond the face of a wall, it is said to be *corbelled out*. See BRACKET, CANTALIVER, CONSOLE.

CO'RBIE, a heraldic term for a raven. See CORBIE-STEPS.

CO'RBIE-STEPS, or Crow'-Steps (Fr. *corbeau*, Lat. *corvus*, a crow). The word corbie or corby, though obsolete in English, except as a heraldic term, has retained its place in the Scottish dialect, and in architecture C. signify the succession of steps with which the gables of old houses are everywhere ornamented in Scotland. The fashion, like most of the other peculiarities of Scottish architecture, was no doubt borrowed, as was the term, from France. In the domestic buildings of Edinburgh, it is found in the highest degree of prevalence between 1620 and 1640. The notion, of course, was that the steps were for the use of the crows. This gable ornament is by no means peculiar to France, but is met with in Flanders, Holland, and all over Germany. Parker, in his "Glossary," gives an illustration from Cologne.

CO'RCHORUS, a genus of plants of the natural order *Tiliaceæ* having five se-

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pals, five petals, numerous stamens, and a capsule; and containing a number of species, both shrubby and herbaceous, natives of the warm parts of the globe. *C. olitorius* is widely diffused in tropical countries, and is supposed to be a native of Asia, Africa, and America. It is an annual, with a smooth, more or less branching stem; varying in height from two to fourteen feet or upwards, according to soil and climate. It has smooth, stalked, alternate, oval, or ovatolanceolate leaves, and small yellow flowers, solitary or in pairs on foot stalks. It is much used as a pot-herb, and is called JEWS' MALLOW, from being much cultivated by Jews in Syria and other parts of the East. It is still more valuable for the fibre of its inner bark, as is also *C. capsularis*, a species very similar, but distinguished by the want of transverse partitions in its capsule. Both are much cultivated in India, yielding the greater part of the JUTE (q. v.) of commerce, and of the fibre employed in making *Gunny Bags* (q. v.). *C. capsularis* being extensively cultivated in China, is sometimes called CHINESE HEMP.

The Japanese shrub, now very common in Britain, and still very generally known as *C. Japonicus*, was ranked in this genus when botanists were very imperfectly acquainted with it, but belongs to the genus *Kerria*, of the natural order *Rosaceæ*.

CO'RDAGE, a seaman's name for the running rigging of a ship, as distinguished from the standing rigging. The name is also given to the store of rope kept in reserve. See RIGGING, ROPE.

CORDAY D'ARMANS, Marie Anne Charlotte, known as Charlotte Corday, was born at St Saturnin, in the department of Orne, in 1768. Though descended from a noble family, she early imbibed revolutionary principles, but was horrified at the monstrosities of the Jacobins; and her hatred of their acts was intensified by converse with a party of proscribed Girondists, who had fled to Normandy. She resolved to rid her country of one of the principals of the Jacobin faction, and with that view travelled to Paris. Whether to slay Robespierre or Marat, was an open question with her; but while she was debating the matter with herself, a demand of the latter for a hundred or two hundred thousand more victims for the guillotine, marked him out for her weapon. Twice she sought admission to Marat unsuccessfully, but on a third occasion (July 13, 1793), was admitted on the plea that she had important news from Caen to communicate. She found Marat in his bath, who, to some statement she made, declared that the Girondists who had fled to Normandy, some of whom were her own friends, would be guillotined in a few days. She no longer hesitated, but plunged her dagger into the monster's heart, who expired with a single groan. She was at once arrested, and brought before the Revolutionary Tribunal, where she boldly avowed and justified her act. She was of course condemned to the guillotine, and the sentence was carried into effect on the 17th July 1793. Her beauty added greatly to the interest which her sanguinary heroism inspired.

CORDELIERS ("cord-wearers") was the name applied, in France, to the strictest branch of the Franciscan friars, on account of their wearing a girdle of knotted cord. At one period, this order had no less than 284 male and 128 female convents. During the Revolution, the name was applied to the members of a political club which assembled in the chapel of a Franciscan monastery, and exercised (chiefly in Paris, however) great influence on the progress of the revolution. It was instituted in 1790. Its leaders were men of various opinions, including Danton, Hébert, Camille Desmoulins, and Marat. The C. were generally opposed to the Jacobins (q. v.); but it may be asserted that in these two clubs all the great popular movements of the revolution had their origin. In the session of the C., May 22, 1793, the insurrection which marked the close of the Reign of Terror was plotted. While the club was at the height of its influence, Camille Desmoulins commenced to issue his popular journal, "Le Vieux Cordelier." Soon after the fall of Danton, the C. club lost its influence, and was an insignificant affair when it was closed by the Convention.

CO'RD-GRASS (*Spartina*), a genus of grasses having compound spikes, the spikelets arranged on one side; and having only one perfect floret, and very unequal glumes. One species, *S. stricta*, found in muddy salt-marshes on the east and south-east coasts of England, although remarkable for its extreme stiffness and rigidity of habit, is used for making ropes, on account of the toughness of its fibre.

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CORDIA'CEÆ, a natural order of exogenous plants, closely allied to *Boragineæ*, from which it differs chiefly in its drupaceous 4—8-celled fruit. It consists of trees with rough leaves, chiefly natives of the tropics, although some are found in cool parts of South America. The fruits called Sebesten (q. v.), or Sebesten Plum, belong to this order, and to the genus *Cordia;* which also contains some valuable timber-trees, particularly the Spanish Elm, Prince Wood, or *Bois de Chypre* of the West Indies (*C. Gerascacanthus*). It is a dark brown wood, faintly striped, tough, elastic, and fine grained.

CORDI'LLERAS OF CENTRAL AMERICA. The word *Cordillera* literally signifies a chain, and is applied in Spanish America to a chain of mountains. The C. of South America are described under Andes. Those of Central America extend from the commencement of the Isthmus of Darien to the north of Mexico and California, and spread themselves, to speak generally, from sea to sea, presenting many diversities, and occupying the states of New Granada, Costa Rica, Nicaragua, Honduras, San Salvador, Guatemala, the Mexican Confederation, and New Mexico. They gradually increase in elevation from the Isthmus of Panama, where at one point they are only 260 feet high, until, in Mexico, they reach a height of more than 17,000 feet, and form magnificent plateaux.

CO'RDON, in military operations, is a line of sentries enclosing or guarding any particular space of ground, to prevent the passage of persons other than those belonging to the army. The sentries are placed within sight of each other. If intended to guard against contagious diseases, it is called a *C. Sanitaire.*

CO'RDOVA, or Cordoba, a city of Spain, capital of the province of Cordova, is situated in the midst of olives and palm-trees on the Guadalquiver, here crossed by a stone bridge of 16 arches, constructed by the Moors. Lat. 37° 52' n., long. 4° 49' w. Its old Moorish walls and convent-crowned hill in the background give it quite an Oriental aspect; but its beauty, like most Oriental beauty, is merely external; inside, its streets are narrow, dark, and dirty, with a general appearance of decay. Many gardens are enclosed within the walls. Among the principal buildings is the cathedral, formerly a Mohammedan mosque, an immense structure, dating from the 8th c., and generally regarded as the finest type of a Moslem temple in Europe. Internally, its columns, composed of various colored marble, jasper, and porphyry, form a perfect grove, there being still some 850 remaining, though at one time there were about half as many more. The bishop's palace, an old residence of the Moorish kings, now used as stables, and several of the churches and convents, are also noteworthy. C. was, at one time, celebrated for its manufacture of Cordovan (q. v.), but that has now greatly declined. Its silversmiths and filigree workers have still a good reputation; and there are manufactures of paper, silken fabrics, hats, &c. Its inhabitants are proud, above even the pride of Spaniards. Pop. 42,-900. C. is a very ancient place, having been founded by the Romans as Corduba, 152 B.C. Cæsar, 45 B C, put 22,000 of its inhabitants to death for having sided with Pompey. Taken by the Goths in the 6th c., it soon after fell into the hands of the Moors, and became the capital of the Moorish empire in Spain. From the 9th c. to the 12th c., it was one of the greatest centres of commerce in the world, and is said to have contained a million inhabitants. It was taken by Ferdinand III. of Castile in 1236, and never afterwards regained its prosperity. In modern times, C. was taken and plundered by the French under Dupont in 1808. C. is the birthplace of the two Senecas, the poet Lucan, and the astronomer Averroes. The province of Cordova has an area of 5159 square miles, and a pop. (1870) of 382,652. See ANDALUSIA.

CORDOVA, the capital of a state of the same name in the Argentine Confederation (q. v.), is situated on the Rio Primero, a tributary of the Parana, in lat. 31° 26' s., and long. 63° 55' w. It was founded by the conquerors of Tucuman in 1573. It has a cathedral and several churches, with a population of 23,523. The state of which C. is capital is situated near the centre of the Confederation, and contains about 57,275 square miles, with a population, in 1869, of 210,506, who occupy chiefly its western section. Cattle, sheep, and goats are numerous; and the soil is much fitter for maize and fruits than for wheat. The surface is mostly mountainous; and the ranges, which here and there are 2500 feet above the sea, are interspersed with barren flats of stone and sand.

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CO'RDOVAN, a species of leather prepared from goat-skins. It was originally, and at one time exclusively, manufactured by the Moors of Cordova, and hence its name. The best C. still comes from the Levant. It is used in bookbinding, and in the finer kinds of boot and shoe making.

CORDYLINE. See TI.

CORE'A, a peninsular kingdom of Eastern Asia, tributary to China; lat. 34° 40' to 42° 30' n., and long. 125° to 129° e., with an area estimated at 79,414 square miles. It is bounded e. by the Sea of Japan; s. by the Yellow Sea; w. by the Yellow Sea and Gulf of Pechili; and n. by the rivers Ya-lu and Tu-mŏu, which separate C. from Chinese and Russian Mantchuria respectively. These rivers take their rise from the eastern and western slopes of the vast desert mountain-tract of Ch'ang Peh Shan. Other considerable rivers are the P'ing Jang, discharging into the Yellow Sea in lat. 39°; and the Han, also flowing west, near the mouth of which is the capital, Seoul or Saul (Chinese, Wang King). All accounts represent the country as mountainous throughout, densely wooded in some districts, with valleys moderately fertile. The climate, which in the north is glacial, is elsewhere like that of Japan. There is ice and snow everywhere in winter. The rainfall of C. is excessive.

There is good reason to connect the people with the Tungusic stock that has peopled the whole of Northern Asia. The features of the Coreans are more pronouncedly Mongolian than those of the Japanese, whom they most resemble. The language, differing widely from both Chinese and Japanese, resembles the latter in its polysyllabic form and alphabet of 27 letters, and has affinity with the existing Mongolian tongue. The native alphabet and writing is almost disused; the Chinese character is everywhere known. The religion of C., like its other official institutions, is based on that of China; the Chinese state gods are everywhere worshipped; Buddhism and Taoism have their votaries; and the literati profess the Confucian ethics. The monarchy is a despotism limited by the existence of privileged ranks and hereditary nobles. The officials are selected. The life of the Coreans is very primitive; the chief articles of food are inferior kinds of rice and grain. Agriculture is very backward. A little tobacco, cotton, and silk is produced. The principal fabrics are of coarse hemp. The only products bartered with the Chinese are paper and ginseng. Mineral treasures abound; small quantities of gold, silver, iron, copper, and lead are mined; and the Coreans are skilful in working metals. The pop. is variously estimated at from 5,000,000 to 20,000,000.

C. has steadfastly maintained a policy of strict isolation towards all outsiders, even towards the Chinese, with whom there is no intercourse save on occasion of the annual embassy, which is accompanied by a few privileged traders, and of the periodical fairs at the "Gate-town," near the city of Fêng-hwang, in Mantchuria. The Chinese dislike to everything foreign is strengthened in the case of C. by traditions of ancient enmity between China and Ch'ao-sien, as C. was called in the 2d century B.C. The Mongol conquerors of China reduced C. also; but the Ming dynasty restored the Corean sovereign with the title of Kaoli-Wang (from which word Kaoli, through the Japanese form Ko-rai, comes the name Corea). Strange to say, the seeds of Christianity were sown in C. in 1592 by the invading army, composed chiefly of Christian converts, of the Japanese usurper, Taicosama. Hamel, a Dutch sailor, was wrecked here and detained for thirteen years; from his narrative it was that, till very recently, most of our scanty knowledge of C. was obtained. In 1784, Jesuit missionaries found their way into C., and had great success amongst the people. From 1835 till 1866, several intrepid and devoted French missionaries contrived to find shelter; and in spite of incessant persecutions, the Christian community continued rather to increase, rising again, in 1852, to 11,000 souls. The massacre of nine missionaries, in 1866, led to an invasion of C. by a small French force, but without success. Nor have two successive American expeditions, provoked by an attack on an American vessel, succeeded in contributing at all to break down the barriers that have so long separated the Coreans from the rest of the world.

See "Journeys in North China," by Rev. A. Williamson (1870); "Histoire de l'Eglise de Corée," par. Ch. Dallet, Missionaire Apostolique (Paris, 1874).

CORE'GONUS, a genus of fishes of the family *Salmonidæ*, having the first dorsal fin further forward than the ventrals, and higher than it is long, the scales

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large, the teeth either minute or wanting. The species are numerous, and some of them inhabit the sea, others fresh-water. To this genus belong the Gwyniad of the lakes of Wales and Cumberland, the Powan of Loch Lomond, the Pollan of the lakes of Ireland, &c. From their herring-like appearance, the Gwyniad and Powan are often called *Fresh-water Herring*. Some of the species found in the lakes and rivers of North America are also known as *Herring Salmon*; but a more valuable species, regarded as one of the finest of all fish, is the WHITE FISH (*C. sapidus* or *albus*) of North America. Other species are found in the rivers and lakes of Europe, even to the North Cape, in those of Siberia, &c.

CORE'LLI, Arca'ngelo, surnamed *Il Divino*, an Italian musical composer, was born at Fusignano in the Bolognese, in 1653. He studied counterpoint with Matteo Simonelli, and the violin with Bassini. In 1672, he visited Paris, and in 1680, Germany, where he was well received. In the following year he returned to Italy, and fixed his abode at Rome, where in 1683 he published his "Twelve Sonatas for Two Violins and a Base." In 1685 appeared another set, bearing the title of "Balletti da Camera." A third and fourth set were published at Bologna in 1690 and 1694. In 1700 appeared his sonatas for violin and bass, or harpsichord. This work is one of C.'s master-pieces, and has placed him in the first rank of instrumental composers. C.'s greatest effort was his "Concerti Grossi," which appeared only six weeks before his death. The style of C. is one of the very best, and his works continue to the present day models of classical study in instrumental music.

CORENTY'N, a river of Guiana in South America, rises in lat. 1° n., having its head-waters 25 miles to the east of those of the Essequibo. With a generally northerly course, it separates the Dutch and British portions of the country; and at its mouth, in lat. 6° n. and long. 57° w., it forms an estuary of 25 miles in width. It is navigable for boats about 150 miles upwards, measured by its windings; and at a point still higher, where further exploration was impeded by a series of cataracts, it was found to be 900 yards across. The C. is one of the streams by which Guiana possesses comparatively easy means of communication with the basin of the Amazon on the one side, and that of the Orinoco on the other.

CORFE CASTLE, a village in the middle of Purbeck isle or peninsula, in the south of Dorsetshire, 24 m. e.s.e. of Dorchester. In the vicinity are stone and marble quarries, and clay-works for the potteries. Pop. of Parish (1871) 1906. A castle, giving its name to the village, stands on a neighboring hill. It seems to have been founded in the 10th c., and was long one of the strongest fortresses in the kingdom. Here King Edward the martyr was murdered by his stepmother, Elfrida, about 980, and King John, during his disputes with his barons, kept his regalia here for safety. Here also, in 1642, Lady Bankes defended the castle for six weeks against Charles I. It was dismantled by Fairfax in 1645.

CO'RFU, the most northerly of the Ionian Islands (q. v.), in lat. 38° 40'—39° 40' n., long. 19° 10'—20° e. It has a length of about 38 miles, with a breadth varying from 3 or 4 to 20 miles. Area, 227 square miles. Pop. (1871) 72,466. Like the rest of the Ionian Islands, it is mountainous, and the mountains are generally naked and dry, the highest summit, Pandokrátora being between 3000 or 4000 feet above the sea. The valleys, however, are very fertile, and yield olive-oil, wine, honey, oranges, figs, &c. Salt is also produced in some quantity. The climate is generally mild and healthy. The principal town, Corfu, underwent great improvements during the British protectorate, and is copiously supplied with water. It is situated on an elevation, has some good streets and a fine esplanade. The town with about 25,000 inhabitants and a considerable trade, is the seat of an archbishop of the Greek Church, and of a Latin Bishop.

The principal institutions are the penitentiary, the lunatic asylum, the infirmary, foundling hospital, &c. The University, founded by Lord Guilford in 1826, now represented by a lyceum, was suppressed when (in 1864) the Ionian Islands were incorporated with the kingdom of Greece. At the incorporation it was stipulated that Corfu and Paxo were to enjoy perpetual neutrality. The language spoken is considered the softest of the modern Greek dialects.—The ancient name of the island of C. was *Corcyra*. It is said to have been occupied first by the Phæacians, and then by the Liburnians; but the accounts of it are somewhat mythical until its settlement by the Corinthians about 734 B. C., and through its commerce it soon

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after acquired a considerable importance. It soon quarrelled with the mother-country, and after many vicissitudes of fortune, passed under the dominion of the Romans about 229 B. C.

CORIA'NDER (*Coriandrum sativum*), an annual plant of the natural order *Umbelliferæ*, with branching stem, 1—2 feet high, the lower leaves bipinnate, the upper leaves more compound, and globose fruit. It is a native of the south of Europe and of the east, and has long been cultivated for the sake of its fruit; and has thus become naturalised in some parts of England, although its fruit (*C. seed*) is much less used in Britain than in Germany, and some other European countries. The whole plant, when fresh, has a very offensive smell; but the ripe and perfectly dry fruit has an agreeable aromatic smell and a sweetish aromatic taste. It is used in medicine as a carminative, and as a corrective of certain purgatives; also in domestic economy as an aromatic, being very often mixed with bread in the north of Europe; spirituous liquors are flavored with it; and confectioners cover it with sugar, to make a well-known kind of comfit. In the south of England, it is common to sow C. and caraway together, the C. yielding a crop in the first year, and the caraway in years following. C. delights in a rich soil, and is much cultivated and used in India.

CORIGLIA'NO, a town of Italy, in the province of Cosenza, about 4 miles from the Gulf of Taranto, beautifully situated on a hill, round which it is built in the form of an amphitheatre, a fine old castle crowning the summit. The base of the eminence is clad with lemon and orange groves, amid which rise some elegant villas; the whole rendering C. one of the most agreeable places in the Calabrias. It has extensive liquorice manufactories, and a trade in wine and fruits. Pop. 10,600.

CORI'NGA, a maritime town in the collectorate of Godavery, and province of Madras, stands on the south side of the estuary of a river of its own name, one of the branches of the Godavery. Its harbor is breasted by a bar, which at spring-tide shews a depth of 12 or 14 feet. Besides having a considerable general trade, it is the best place on the coast for the building and repairing of small vessels. It has been twice destroyed by inundations of the sea. In May 1787, during the north-east monsoon, the tide overwhelmed the city and the adjacent country, drowning about 15,000 people; and again in 1832, a similar deluge occurred, leaving behind it, besides the more ordinary traces of its power, several ships lying high and dry in fields in the neighborhood. Pop. (1871) 5649.

CORI'NNA, a Greek lyric poetess, famous alike for her beauty and genius, was born at Tanagra, in Bœtia. The date of her birth is not known, but she flourished about 500 B. C. She lived principally at Thebes, and hence is sometimes called a Theban. Ælian states that on five different occasions she vanquished her contemporary, Pindar, in a poetic contest, but Pausanius alludes to only *one* victory of hers. Her townsmen shewed their appreciation of her genius by placing a statue of her in their gymnasium. She was surnamed *Muia* ("the Fly"), probably on account of the tenderness and softness of her poems. Of her numerous poems, which were composed in the Æolic dialect, only a few fragments remain, which have been published by Schneidewin, in his "Delectus Poetarum Græcorum" (Gött. 1839), and by Bergk, in his "Lyrici Poetæ Græci" (Leip. 1843).

CO'RINTH (originally called *Ephyre*), a famous city of antiquity situated on the isthmus connecting the northern division of Greece, or Hellas proper, with the Peloponnesus. Its citadel was the Acrocorinthus, an isolated hill 1886 feet high, separated from the Oneian range on the north of the isthmus by a ravine, and forming, in the opinion of Colonel Mure, the most gigantic natural citadel in Europe, neither the Acropolis of Athens nor the fortress of Gibraltar being able even remotely to compete with it. At the northern foot of this hill lay the city of C., on a broad level rock nearly 200 feet above the level of the isthmus. It was probably founded by the Phœnicians, who had various settlements on the Grecian coast, and who could hardly have failed to notice the extraordinary maritime advantages of its situation. According to its legendary history, however, it was founded by Sisyphus, the Æolian, about 1350 B.C. It was then conquered by the Heracleidæ, who ruled as an obligarchy for twelve generations, when they were expelled by Cypselus, the father of Periander, with the help of the populace, 657 B.C. After a period of 77

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years, the Spartans—the great enemies of democracy in Greece—established again a sort of aristocratic government, and C. now figures in history as the close ally of Sparta. In the Peloponnesian war, it at first furnished the greater part of the fleet employed against the Athenians, but afterwards became jealous of the Lacedæmonian power, and was induced to league with other Grecian states against it, 395 B.C. The war which ensued is known as the *Corinthian War*, and lasted till the peace of Antalcidas, 387 B.C. In the strife which broke out between Thebes, and Sparta, C. remained faithful to the latter. After the battle of Chæroneia, 338 B.C., in which the liberties of Greece were crushed by the Macedonians, it was garrisoned and held by the latter. Subsequently, it was the centre of the Achæan league formed against the Romans, and in revenge was utterly destroyed (146 B.C.) by L. Mummius, the Roman general. For a whole century it continued in ruins. In 46 B.C., Julius Cæsar rebuilt it, and made it the capital of Achaïa; and, although it never again attained its former importance, it became both prosperous and powerful. St Paul planted a Christian church here, to which he also addressed two epistles. Pausanias, who visited it in the 2d c. A.D., states that it then contained many public buildings. From the Western emperors it passed into the hands of the Venetians. In 1458 A.D. it was conquered by the Turks under Mohammed II., recovered by the Venetians in 1687, and retaken by the Turks in 1715, who held it till 1822. Reduced to ashes in the revolutionary war, and again utterly destroyed by an earthquake in 1858, C. is being now rebuilt in a more convenient position near the shore of the Gulf of C. Its pop. is about 2000.

Ancient C. was surrounded by walls which included the Acrocorinthus, and had two harbors—*Lechæum*, on the Crisæan Bay (now the Gulf of Lepanto), opening into the Adriatic; and Cenchreæ, on the Saronic Gulf (now the Gulf of Athens), opening into the Ægean. The former was connected with the city by two parallel walls. The vast wealth of its merchants was the bane of Corinth. It became notorious as the most licentious city in all Greece and was the favorite resort of courtezans. The patron goddess of the city was Aphrodite, in whose temple, on the Acrocorinthus, were kept more than a thousand "sacred female slaves" (*Hierodoulοi*) for the use of strangers. C., however, has better claims to remembrance. The art of painting is said to have been invented here, and at the time of its capture by the Romans, it possessed some of the finest pictures in Greece. Among these, was the picture of Bacchus, by Aristides, for which Attalus offered 600,000 sesterces. Architecture, statuary, and bronze-work also flourished, and earlier, during the reign of Periander, poetry was cultivated, Arion having either invented or improved the dithyramb in Corinth. Afterwards, however, no attention was paid to literature by the inhabitants, and it has been noticed that "among the illustrious writers of Greece not a single Corinthian appears."

CORINTH, Gulf of, or Gulf of Lepa'nto. An arm of the Mediterranean extending from west to east through the centre of Greece, from the Ionian to within about 5 miles of the Ægean Sea, thus almost dividing the kingdom into two parts, the Morea forming the southern portion. Its greatest length is about 75 miles, with an average breadth of 15 miles. The outline of the coast is exceedingly varied, and the scenery is everywhere as attractive as it is rich in contrast. The narrow neck of land, separating the Gulfs of C. and Ægina, and uniting the Morea to Attica, is called the Isthmus of Corinth. It is variously estimated, according as it is measured from different points, at from 10 to 20 miles in length, and its breadth varies from 4 to 8 miles. The project of cutting through this isthmus, in order to unite the Ionian and Ægean Seas, was one early entertained, and attempted to be carried out by Nero without success. To protect the Morea from land attack, however, a strong wall, flanked with towers, was built across the isthmus, and traces of it may still be seen, as well as of other remains of antiquity. The celebrated Isthmian games were contested upon this tract.

CORI'NTHIAN O'RDER. See Column.

CORINTHIANS. Epistles to the, were written by St Paul 57 or 58 A.D. The first was composed at Ephesus; the second, according to general opinion, at Philippi, but this is doubtful. The genuineness of both is all but universally recognised. From the contents of 1 Cor., chap. 5, verse 9, it has been concluded by many theologians that Paul must have written a previous epistle, now lost.

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CORIOLA'NUS, Caius or Cnæus Marcius, a Roman patrician, surnamed, according to the half-fabulous legend, C., on account of his capture of the town of Corioli, belonging to the Volsci (493 B.C.). Of a proud and haughty spirit, he was strongly opposed to the plebeians, whom he looked upon as the "enemies" of his order; and on one occasion, during a time of famine, he argued in the senate against a gratuitous distribution of the corn which had arrived from Sicily, and insisted that the plebeian tribunes, lately instituted, should first be discharged from office. For this he was impeached, and banished. He took refuge among the Volscians, whom he aided in their war with the Romans. His victories at the head of the Volscian troops alarmed the Romans, who, on his approach to their city, sent a variety of deputations to plead with him. He was deaf to every entreaty. At last, the noblest matrons of Rome, headed by his old mother and his wife Volumnia, leading her two children, came to his tent. His burning desire to be revenged on those who had dishonored him was cooled by the tears of his relatives, and he led back the Volsci to their own territories, where he lived to an advanced age. Shakespeare has written a play on the subject, in which the character of C. is conceived in the grandest and most aristocratic style.

CORK (Span. *corcho*, from Lat. *cortex*) is the unusually developed *epiphlœum* (See BARK) of the bark of the C.-tree or C.-OAK (*Quercus suber*), the *Alcornoque* of the Spaniards, a species of Oak (q. v.), a native of the south of Europe and north of Africa. Spain and Portugal chiefly supply the world with C., and in these countries, the tree is often planted for the sake of the cork. The C.-tree is not of great size, generally 20—40 feet high, much branched with ovate-oblong evergreen leaves, which are sometimes entire and sometimes sharply serrated. The acorns are eatable, and resemble chestnuts in taste. The bark in trees or branches from three to five years old acquires a fungus appearance, new layers of cellular tissue being formed, and the outer parts cracking from distension, until they are finally thrown off in large flakes, when a new formation of the same kind takes place. C. intended for the market is generally stripped off a year or two before it would naturally come away, and the process is repeated at intervals of six or eight years. The bark of young trees and branches is either useless or of very inferior quality; it is only after the third peeling that good C. is produced. The removal of the C. being not the removal of the whole bark, but only of external layers of spongy cellular tissue, all or greater part of which has ceased to have any true vitality, and has become an incumbrance to the tree, is so far from being injurious, that when done with proper care, it rather promotes the health of the tree, which continues to yield crops of C. for almost 150 years. In stripping off the C., longitudinal and transverse incisions are made to the proper depth, and each piece is then cut away from the tree by a curved knife with two handles. The pieces are soaked in water, pressed flat, dried, and superficially charred, to remove decayed parts and conceal blemishes, before they are packed in bales for the market. Besides the use of C. for stopping bottles, casks, &c., it is much used, on account of its lightness, for floats of nets, swimming-belts, &c.; and on account of its impermeability to water, and its being a slow conductor of heat, inner soles of shoes are made of it. All these uses are mentioned by Pliny; but the general employment of corks for glass bottles appears to date only from the 15th century. The *Spanish Black* used by painters is made by burning C. in close vessels, and the parings of C. are carefully kept by C.-cutters for this purpose. There are many other applications of this valuable substance in the arts, which cannot be here detailed.

The C.-tree is occasionally planted in the south of England, but the climate is not sufficiently warm.

The wood of some trees possesses the cellular sponginess, lightness, and elasticity of C. in such a degree as to be sometimes substituted for it in many of its uses, as that of the *Anona palustris* (Corkwood, or Alligator Apple) in the West Indies, &c.

CORK-CUTTING. The bark, after being cut into square pieces or sheets, is pressed, to remove its natural curvature and flatten it. If it is found that simple pressure has not flattened it sufficiently, it is heated on the convex side, and the contraction thus produced straightens it. It is then cut into slips, and these slips into squares, according to the required size of the corks. These are rounded by the cork-cutter by means of a broad sharp knife; the cork is held in the left hand, and rested against

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a block of wood, and the knife pushed forward, and at the same time its edge is made to describe a circular curve by a skilful turn of the wrist. The knife requires continual sharpening; the workman has a board before him on which the knife is rubbed on each side *after every cut*.

Many attempts have been made to cut corks by machinery. A patent C. company was established a few years since, but it failed. The chief difficulty in applying machines to this purpose arises from the necessity of continually sharpening the knife or cutters, for it is a curious fact, that so soft a substance as cork blunts the tools used in cutting it far more rapidly than do the hardest or toughest of metals. A cork-cutter's knife requires sharpening every second, while the tool that is used for planing, turning, or boring steel will work continuously for hours without sharpening. In most of the machines, the corks, after being cut into squares of the required length, are made to revolve on grasping spindles; and cutters of various forms, such as revolving cutter-wheels, hollow cones with internal cutters, reciprocating blades, toothed cutters, &c., are brought to bear upon the revolving cork.

CORK, Rock. See ASBESTUS.

CORK, a city and parl. borough of Ireland, capital of the county of the same name, and a county in itself, on the Lee, 11 miles above its discharge into the sea, stands in the centre of a picturesque valley. It is built in part on an island, formerly a swamp, which the word *Cork*, *Corcoch*, or *Corcagh* implies; in part, on the n. and s. slopes of the river-banks. The houses are generally of old red sandstone. Nine bridges cross the river to the central islands. There is a spacious public park, and a walk above a mile long, lined by noble elms, on the west of the city. There is also a handsome public cemetery. C. has a pleasant picturesqueness from its uneven ground, irregular streets, intersecting river, and overhanging heights. The chief buildings are St Anne Shandon's Church, with a tower 170 feet high; several Catholic churches; 4 monasteries; 2 nunneries; the Bishop's Palace; and Queen's College, a fine Tudor-Gothic quadrangular building, opened in 1849. The banks of the Lee above and below C. are richly planted, and studded with villas. The Lee is navigable to about a mile above the city, and on the improvement of the navigation the harbor commissioners have expended above £300,000 within the last 25 years. The extent of the quays is now above 4 miles, and ships of 600 tons reach them. C. harbor, noted for its size and safety, is a basin of 10 square miles, formed by the estuary of the Lee. It could contain the whole British navy, and has been the main source of the rise and progress of the city. The estuary contains several large isles, rising abruptly and high above the water, with narrow channels between them. The entrance is by a channel two miles by one, defended by batteries, on Spike, Hawlboline, and Rocky Islands, which are occupied by convict and ordinance depôts, artillery barracks, and a powder-magazine. On the shores of the estuary are the towns of Passage and Queenstown, formerly Cove of Cork. C. harbor is much frequented by wind-bound ships and ships waiting orders. In 1875, 2569 vessels, with a total tonnage of 681,670 tons, entered the port; and 1537, of 443,057 tons, cleared. The harbor revenue in 1875 was £64,918. The chief manufactures are leather, iron, gloves, ginghams, friezes, flour, malt liquors, and whisky; iron ship-building has been largely carried on since 1872. The chief exports are grain, provisions, butter, live-stock, and linen, valued at several millions sterling yearly. Pop. (1871) 78,642; parl. bor., 100,518; of whom about 5-6ths are Roman Catholics. C. returns 2 members to parliament. C. grew up around an abbey founded in 600 by St Finbar. The Danes in the 9th c. built the city walls. Dermod Maccarthy, king of Cork or Desmond, surrendered it to Henry II. in 1172. Cromwell besieged and took it in 1649, and Marlborough in 1690. James II. landed at C. in 1689. In C., William Penn, the founder of Pensylvania, became a Quaker, with several of the soldiers of the republican garrison.

CORK, a maritime county in Munster, the southmost and largest of the Irish counties. It is bounded on the n. by Limerick, e. by Tipperary and Waterford, s. by the Atlantic, w. by Kerry. Greatest length from e. to w., 110 miles; greatest breadth, 70; average, 54. Area, 1,849,683 acres, of which 430,541 were under tillage in 1876. C. is hilly, with great variety of surface. The w. part is rocky, mountainous, wild and boggy; the e. and s., rich, fertile, and picturesque. The ranges run e. and w., except the Boghra Mountains, between the Lee and Blackwater. The

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coast is bold and rocky, and from its indentations, 250 miles long; the bays, which run 8 to 25 miles inland, admitting large vessels. The chief bays are Bantry, Dunmanus, Clonakilty, Kinsale, Cork Harbor, and Youghal. There are many isles off the coast, the chief being Whiddy (in Bantry Bay), Bear, Innisherkin, Great Island, and Cape Clear, which lies in lat 51° 25′ n. and long. 9° 30′ w., and, with the exception of a rock 4 miles to the s.s.w., is the southmost point in Ireland. In the w., C. is divided from Kerry by a range of Silurian clay-slate, running n. e. and n., the chief points being 1200 to 2200 feet high. This range sends offshoots to the east, which divide the county into the parallel basins of the three chief rivers of C., the Blackwater, Lee, and Bandon: the lower parts of these basins are well cultivated and productive. The basins of the Lee and Bandon consist of red and yellow Devonian sandstone, with some beds of lower carboniferous limestone. This limestone, as in other parts of Ireland, forms the largest lowland tracts and valleys of the county. The Blackwater basin also consists of Devonian strata, but with more limestone. Part of the Munster coal-field occupies 400 square miles in the n.w. of the county, with a cold, stiff, moory soil over it. The river-beds generally mark the limestone tracts. C. has many small lakes in the west. One of these lies at the source of the Lee, amid wild picturesque scenery with the ruins of a chapel on an islet frequented by pilgrims. The chief mineral productions are coal and iron, copper (the mines of which are the richest in Ireland), limestone, fine dark-gray and also red marble rich in fossil shells, fullers' earth, brick-clay, marl. There is a thermal magnesian spring at Mallow. The climate is moist, but genial. The soils are calcareous loamy, and moory. The dairies are extensive, and C. butter stands in high estimation. The cattle are small in size, but yield large quantities of milk. Of the land under crops in 1876, 18,043 acres were under wheat, 117,332 acres under oats, 21,950 acres under barley, bere, and rye, 71,958 acres under potatoes, 39,528 acres under turnips, 15,720 acres under other green crops, and 145,870 acres under meadow and clover. The live-stock in the same year consisted of 58,425 horses and mules, 9819 asses, 365,729 cattle, 322,349 sheep, 170,048 pigs, 25,102 goats, and 1,135,967 head of poultry. The chief manufactures are linen, whisky, porter; and the chief exports provisions. Pop. (1841) 854,119; (1851) 653,180; (1871) 517,076. C. county returns eight members in all to parliament—two for the county, two for C. city, and one each for Bandon, Mallow, Kinsale, and Youghal. At the end of 1875 there were 100,705 pupils attending the national schools in C., of whom 95,769 were Roman Catholic, 4194 Protestant Episcopal, and 329 Presbyterian. The antiquities of C. are stone circles and altars, two round towers, circular earthworks or raths; many ruins of abbeys and churches, chiefly built by descendants of the English invaders under Henry II., and many ancient castles or square towers of great historical interest.

CORLEONE, a town of Sicily, in the province of Palermo, about 21 miles from the city of that name. It is situated on a hill near the source of the Belici, and is well built. Its principal public structures are convents and churches. Its inhabitants, about 15,350 in number, are chiefly engaged in agriculture.

CORM (Gr. *kormos*, a stump)—sometimes called a *solid bulb*—the short and bulb-like subterranean stem of many endogenous plants. It annually produces buds in the form of small corms, either from its summit or its side; and these gradually exhaust and destroy it. In functions, as in appearance, the C. resembles the Bulb (q. v.), but its structure is different; it does not consist chiefly of scales, as a bulb does, but of a solid axis covered only with thin membranes. Examples may be seen in the tulip, crocus, gladiolus, colchicum, and arum. When a C. produces young corms from its summit, as in the crocus, they approach in a few years the surface of the soil, however deeply they may at first have been planted.

CORMENIN, Louis Marie de la Haye, Vicomte de, a distinguished French jurist and publicist, was born at Paris, January 6, 1788. Educated for the law, he was, in 1810, appointed auditor of the Council of State, and drew up several of its most important reports. He was elected a deputy in 1828, and from that time until 1846, continued to be re-elected at every election, sometimes by as many as four departments at once. His extensive knowledge of jurisprudence, and of the practical affairs of government, and the clear and logical force with which he could present his ideas

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alike by speech and writing, soon secured him an immense influence in public affairs. After the revolution of 1848, C. had the honor of being elected to the Chamber by four departments, and was nominated president of the commission appointed to remodel the constitution; and in this capacity strongly advocated universal suffrage. He was appointed member of the Council of State reconstituted after the *coup d'état*. In 1855, he was elected a member of the Institut. Besides his numerous pamphlets, C. is author of "Etudes sur les Orateurs Parlementaires," a work which has passed through nearly twenty editions; and of a valuable work on the law of France ("Droit Administratif"). After long silence, C. published in 1860 "Le Droit de Tonnage en Algérie." He died at Paris, 6th May 1868.

CO'RMORANT (*Phalocrocorax*; Fr. *cormorant*; Ital. *corvo marino*; Bret. *morvran*, a sea-crow; Welsh, *mor*, sea, and *bran*, a crow), a genus of web-footed birds of the family *Pelecanidæ* or *Totipalmati*, having, like the rest of that family, the hind-toe united in a single membrane with the other toes; and also characterised by a bare dilatable membrane beneath the lower mandible, extending to the upper part of the throat, but not forming a great sac on the throat, as in the pelicans; a compressed bill, rounded above, and with a strong hook at the point of the upper mandible; the nostrils linear, and seemingly impervious to air; the claw of the middle toe serrated, apparently in order that it may be used in trimming the plumage; the wings of moderate length; the tail-feathers stiff and rigid, and used to aid in walking or climbing. The species are distributed over the coasts of most parts of the world; some of them occasionally ascending rivers in pursuit of fish, on which all of them exclusively live, and even visiting inland lakes. They are proverbial for their excessive voracity. They do not take their prey by diving when on wing, but pursue it by swimming and diving, using their wings in progress under water, and descend to a wonderful depth; the smaller of the two British species has been caught in a crab-pot fastened 120 feet under water. When the prey has been caught in a manner inconvenient for swallowing, they toss it in the air, and adroitly catch it as it descends. Some of the species frequent high rocks, others low islands, on which they make rude nests, chiefly of sea-weed; some perch and even build their nests on mangroves and other trees. Their eggs are covered with a calcareous incrustation. The flesh of all the species is dark and of a fishy taste, but is sometimes used as food, particularly that of young birds. The British species are the Common C. (*P. carbo*), which is mostly of a black color, but for a short time during the breeding-season exhibits a sprinkling of longish white, almost bristly feathers on the head and back of the neck; and the Green C. or Shag (*P. graculus*), which is of smaller size and of a prevailing dark-green color. The Common C. is about 38 inches long. It is a very widely distributed species. It was formerly sometimes tamed in England, to be employed in catching fish, and is still trained to this use in China.

CORN (Ger. *Korn*) meant primarily any small, round, hardy body, like a seed. This general meaning is still seen in its application to concretions on the feet. It is allied to the Lat. *granum*, grain; and to Ger. *Kern*, kernel. As usually applied, C. is a generic name for all seeds used in making bread, especially the seeds of cerealia. But it has also a specific sense, and denotes in any country that grain which furnishes the prevalent bread-stuff of the people. Thus, in England, C. means *wheat*; in America, it means *maize*; and in Scotland, *oats*.

CORN LAWS, the name popularly given to certain statutory enactments which had for their object a restriction of the trade in grain. The English C. L. date as far back as the year 1360, in the reign of Edward III. Before this period, there seems to have been a general rule carried into effect by the crown against the exportation of any grain; and the act of 1360 enacts the prohibition, but at the same time excepts Calais and Gascoigne, with any other places which the king may appoint by licence, from its operation. In 1393, the arrangement was reversed, and the right to export was made general, unless to those places to which it was prohibited by royal proclamation. An act of 1436 permitted exportation when the price of wheat did not exceed 6*s.* 8*d.* per quarter. Hitherto, there seem to have been no prohibitions against importation; but in 1463, an act was passed prohibiting it so long as the price at home was below the 6*s.* 8*d.* at which there was free exportation. The next change was in the reign of Henry VIII., when an act of 1534 prohibited all exporta-

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tion except by licence specially granted under the great seal. This act was not found to work well; and twenty years later, the previous arrangement was adopted of allowing exportation when the price had reached a certain point. The subsequent legislation for some time merely changed the price at which exportation might begin, generally enlarging it. After the Restoration, the policy of increasing the duties on importation, for the protection of agriculture and the landed interest at home, begins to be perceptible. At the same time, the effect of that event on the condition of Scotland and England towards each other forms a curious illustration of such fiscal regulations. Under the Protectorate, they were one country, with free intercommunion of trading privileges. Scotland was increasing in wealth under this arrangement; but the countries were separated by the restoration of Charles II., and became the same to each other as foreign nations. The English duties restricted the importation of grain from Scotland; and in 1663, the Scotch parliament, in retaliation, laid heavy duties on the importation of English and all other foreign grain. Had not the union of 1707 made the countries one again, England and Scotland would probably have continued a corn-law contest against each other, like the French provinces.

The agricultural interest continuing powerfully to modify this department of legislation, an act was passed in 1670, for virtually prohibiting importation, until the home-price had reached 53*s.* 4*d.*, and laying a heavy duty on it above that point. This law had, however, little effect in favor of the landed interest, from the circumstance, that then, and for long afterwards, Britain was an exporting, not an importing country—that is to say, it generally produced more corn than its population required. A new device was adopted at the Revolution, and a bounty was awarded on exportation—that is, a sum was paid to the producer for what he exported, so that if the price in the foreign market might not induce him to send corn abroad, the bounty, in addition to that price, might. For upwards of a century, the numerous enactments in this department will be found to be a mere shifting, according to circumstances, of the incidence of the bounty on the one hand, and of the import duty on the other. In 1773, a permanent adjustment was supposed to be reached by Burke's act, which removed the bounty, and prohibited exportation when the price reached 44*s.*, and allowed importation at a nominal duty of 6*d.*, at a price of 48*s.* Afterwards, and especially during the great war of the French Revolution, it became usual to profess that the chief object of this kind of legislation was to have always a sufficient supply of grain at home for our own wants, and to render us entirely independent of foreign nations for the food of the people. It was maintained that the bounty effected this object, since its tendency was to promote the production of more grain than was necessary at home, and it thus supplied a granary to be drawn upon in case of famine. It was otherwise, however, maintained, that the prohibiting, or, at all events, restraining the introduction of foreign grain, would give a much greater impulse to home production. Looking at it from the agricultural interest solely, this view was well founded; for, as the tendency of Britain to be an importing rather than an exporting country was increasing, the exportation, even with the encouragement of the bounty, was likely to be small. It could not, however, escape consideration, that to increase home production by a pressure on importation, was virtually to aggrandise the landed interest by a pressure on the food of the people. With these views, the price at which importation might begin was raised in 1804, and was again raised in 1814, when the bounty was abandoned as worthless for its purposes. There had been a tendency to what is called "a sliding scale" in the duties on importation. This arrangement was brought into systematic shape by the act of 1814, and subsequently, by the celebrated act of 1828, it reached what was considered by its supporters a state of perfection.

Throughout these various changes there were not wanting writers and speakers who denounced the C. L., and agitated for their removal. But the public at large, though conscious that the laws were some way improper, or at variance with the principles of political economy, did not, till the very last, earnestly unite in calling for repeal. There was a powerful party who defended the C. L., and represented, with wonderful plausibility, that these restrictive statutes were identified with the best interests of the country. Their arguments might thus be summed up: 1. Protection was necessary, in order to keep certain poor lands in cultivation. 2. It was desirable to cultivate as much land as possible, in order to improve the country.

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3. If improvement by that means were to cease, we should be dependent on foreigners for a large portion of the food of the people. 4. Such dependence would be fraught with immense danger; in the event of war, supplies might be stopped, or our ports might be blockaded, the result being famine, disease, and civil war. 5. The advantage gained by protection enabled the landed proprietors and their tenants to encourage manufactures and trade; so much so, that if the C. L. were abolished, half the country shopkeepers would be ruined; that would be followed by the stoppage of many of the mills and factories; large numbers of the working-classes would be thrown idle; disturbances would ensue; capital would be withdrawn; and no one would venture to say what would be the final consequences. It cannot be uninstructive to put on record that these arguments exercised a commanding influence over the laboring classes, the small-town shopkeepers, almost all the members of the learned professions, and a considerable section of both Houses of parliament. Ignorance, prejudice, and timidity were united with selfishness in maintaining the C. L.; and in point of fact, those who endeavored to represent the impolicy of a restricted trade in corn, were generally set down as little better than mischief-makers. The most surprising thing of all was, that the statesmen who ultimately joined in condemning the C.L., could contemplate no other modification than an ascending and descending scale of duties, according as prices fell or rose in the market. About 1840, there was no term better known than that of the *sliding scale*. The object of this device was to reduce the import duty as the price of grain increased, for the purpose of virtually prohibiting the importation when the price was low, and encouraging it when the price was high, so that at famine-prices grain might come in duty free. By the act of 1828, the price of 62*s.* a quarter on wheat was taken as the turning-point. At that price, the import duty was £1, 4*s.* 8*d.* For every shilling less in the price, a shilling was added to the duty. When the price rose above this point, a different gradation ruled, the duty decreasing by a larger ratio than the rise. Thus, when the price was 69*s.* the duty was 15*s.* 8*d.*; and when it rose to 73*s.*, the duty sunk to its minimum of 1*s.* The effect of this fluctuation in rendering the trade a gambling one was, one would think, obvious, and yet it was not acknowledged until it had been proved by a series of ruinous instances. Thus, an importer who, when the price of grain was 73*s.* a quarter, bought a cargo, if the price sunk 4*s.* before he could accomplish a sale, had not only to sell at that reduced price, but with a further reduction of 14*s.* 8*d.* a quarter paid as duty. What was still more important, the supplies to this country being so capricious and irregular, foreign countries did not grow corn habitually for the British market. In 1843, Sir Robert Peel tried a modification of the sliding scale, which did not in the least degree migitate the hostility to the C. L., the noxious nature of which was now beginning to be better understood. Roused by the addresses of Mr Cobden, Mr Bright, and other leaders of the ANTI CORN-LAW LEAGUE (q. v.), the people poured in petitions to parliament; and at length Sir Robert Peel, yielding to representations on the subject, and now avowedly a convert to FREE-TRADE (q. v.), carried a measure to put an end to C. L. in 1846.

The results of the repeal are well known. Every evil prognostication has been falsified. The liberation of the trade in corn has not, however, lowered the price of bread to the extent that some persons anticipated. This is accounted for as follows: an increased demand in consequence of the population increasing in numbers, and also improving in means and taste; the cost of freight and other charges virtually protect the home grower to the extent of several shillings a quarter; and the misdirection of capital from agriculture to manufactures in the United States checks the development of the export of breadstuffs from that country. The small registration duty of one shilling a quarter, maintained till 1869, was abolished in that year; since which time the importation of corn is absolutely free. The substantial benefits arising from the repeal of the C. L. consist in the stimulus given to trade, the removal of apprehensions as to the effects of insufficient harvests, along with a certain modification and less fluctuation in price. The following tables will convey the best illustration of the effects of repeal of the corn laws:

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IMPORTS OF FOREIGN WHEAT, CURRENT PRICES OF WHEAT, AND DECLARED VALUE OF ALL BRITISH EXPORTS FROM 1801 TO 1859.

Average Periods of Ten Years.	Average Amount o Wheat imported.	Average Price of Wheat during each Period.	Average Total declared Value of all British Exports.
	Bushels.	s. d.	£
1801 to 1810	600,946	81 5	40,737,970
1811 " 1820	458,578	94 11	41,506,794
1821 " 1830	584,992	58 3	36,600,536
1831 " 1840	907,688	56 10	45,249,087
1841 " 1850	2,877,999	53 3	57,412,494
1851 " 1859	4,547,311	54 9	168,253,189

TOTAL AMOUNT OF WHEAT AND FLOUR, AND OTHER GRAIN AND MEAL IMPORTED IN 1844, 1849, 1854, AND 1859, DISTINGUISHING THE COUNTRIES WHENCE RECEIVED.

Countries.	1844	1849	1854	1859
	Quarters.	Quarters.	Quarters.	Quarters.
Russia, Northern Ports	97,143	340,633	168,847	1,020,461
" Southern Ports	104,292	572,735	539,856	1,384,080
Denmark and the Duchies	656,576	1,311,086	876,269	1,022,255
Prussia	981,374	1,354,691	728,974	1,011,048
Hanse Towns	129,806	596,673	420,489	298,494
Other Parts of Germany	215,224	416,028	365,190	175,034
Holland	80,216	586,739	250,358	192,906
France	58,265	1,019,410	224,712	2,949,480
Spain	13	26,370	231,503	.....
Italian States	96,797	406,084	117,947	197,041
Wallachia, Moldavia	.....	325,128	147,090	705,290
Turkish Dominions, not otherwise specified	26,389	423,976	303,088	312,984
Egypt	96,047	392,727	588,960	674,257
British North America	258,784	181,622	84,757	82,499
United States	107,812	1,816,425	2,136,228	109,275
Other Countries	122,016	899,889	725,277	885,918
Total	3,060,681	10,069,661	7,909,544	10,270,774

An alteration in the mode of making the trade returns prevents us from giving a continuation of these tables. In 1858, the total import of wheat, grain, and flour was 28,200,941 cwts.; in 1872, it was 47,612,896. Between the period 1801—1810 and 1841—1859, we find an increase in the value of British and Irish exports of £16,674,594. Their value in 1871 was £282,380,726, shewing an increase over the average of the period 1841—1850 of no less than £224,968,232. The value of British and Irish imports in 1851 was £100,460,433; in 1871, it was £329,855,143, shewing an increase of £229,394,710.

CORN A'PHIS, or Wheat A'phis (*Aphis granaria*), a species of *Aphis* (q. v.), or Plant Louse, which is sometimes injurious to corn-crops, appearing in great numbers on the ears, sucking the juices of the plant, and so impoverishing the grain. It infests wheat, barley, and oats. The male is green, the female dull orange.

CORN BEE'TLE (*Cucujus testaceus*), a minute beetle, which inhabits granaries

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and mills, and of which the larva often does much mischief, feeding, like the wee vils, on grain, particularly on wheat. The perfect insect is of a bright fulvous color; the larva ochreous, with a forked tail.

CORN CRAKE. See CRAKE.

CORN FLY, the common name of a number of small dipterous (two-winged) insects, of the large family *Muscides*, particularly of the genera *Chlorops* and *Oscinis*, which do great injury to corn crops. The most destructive in Britain is *Chlorops tæniopus*, a fly about a line and a half in length, of a pale-yellow color, with black stripes, which deposits its eggs between the leaves of young plants of wheat or barley. The maggots living on the juices of the plant produce the disease which, from the swelling of the joint, is called *gout;* and the plant, impoverished, either produces no ear, or an imperfect and partially shrivelled one.

CORN GROUND BEETLE (*Zabrus gibbus*), an insect of the order *Coleoptera*, section *Pentamera*. It is about six lines in length, of a shining pitchy black color, with rusty jaws and legs, very broad and convex, the wings large, the antennæ short and slender. It burrows in the ground, climbs the stalks of wheat and barley by night, and devours the ears. The larva is of a remarkable appearance, whitish, with brown head and thorax, and a brown stripe down the body, powerful jaws, six thoracic legs, and little tufts of hair along the sides of its elongated tapering abdomen. It burrows in the earth, and eats the stems of corn close to the surface of the ground.

CORN MOTH (*Tinea granella*), a small species of moth of the same genus with the Clothes' Moths (q. v.). This moth is satiny and of a cream-white color; the superior wings marbled with gray, brown, and black, and when at rest sloping like the roof of a house, their fringe turned up behind like a tail. It abounds in spring and summer, and lays its eggs either among stored grain or in sheaves in the field. The eggs are so small as to be invisible to the naked eye. The larva, or CORN WORM—which, for its voraciousness, is known as *the wolf*—eats into the grain, and attaches grains together by a web. It attacks indifferently any kind of grain; sometimes also books, articles of pasteboard, woollen stuffs, and even wood. Frequent turning of heaps of corn is resorted to for the destruction of the eggs and larvæ, and salt is for the same purpose mixed with corn; the floors, walls, ceilings, beams, &c., of granaries are scrubbed with hot water and soap, or washed with lime and water, sprinkled with vinegar, &c.; and lamps are employed to attract and kill the moths.—Another very troublesome moth, also called C. M., is *Butalis cerealella*, which is not yet known in Britain, but is found in some parts of Europe and America.

CORN RENT. See RENT, LEASE.

CORN SA'LAD, or Lamb's Lettuce (*Fedia* or *Valerianella*), a genus of plants belonging to the natural order *Valerianaceæ*, having a toothed calyx and 5-fid corolla, three stamens, and a 3-locular fruit, crowned with the calyx. The species are annual plants of humble growth, with repeatedly forked stems and very small flowers, growing in cultivated grounds, &c. Several species very closely resembling each other are natives of Britain, and others are found on the continent of Europe. Some of them are frequently used as spring salads, and sometimes as a substitute for spinage, particularly the common C. S. (*F.* or *V. olitoria*), the most abundant species in Britain, the *Mâche* of the French, *Rapunzcher* of the Germans. It is a favorite salad in France and Germany, although it is mucilaginous and wants pungency. The lower leaves are somewhat spoon shaped, the upper leaves oblong. The plant is extremely easy of cultivation, and can be obtained in the very first days of spring, when vegetables are scarce. The VINEYARD SALAD of the Germans (*F.* or *V. carinata*), and ITALIAN C. S. (*F.* or *V. eriocarpa*), are sometimes preferred for their larger leaves or finer flavor.

CORN SAW'FLY (*Cephus pygmæus*), a species of Sawfly (q. v.) which sometimes does much mischief in cornfields, particularly to wheat and rye; the female, by means of her ovipositor, laying her eggs in the stems either below the first joint or just under the ear; the larva consuming the inside of the stalk, sometimes perforating the joints, and at last cutting it through near the ground, and undergoing its transformation into the pupa state in the stump which remains. The C. S. is

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almost half an inch long, of a very slender form, shining black with some yellow markings; the larva is fat, tapering, wrinkled, and yellow. The fly is often to be seen on the flowers of umbelliferous plants.

CORN THRIPS (*Thrips cerealium*), a minute insect, not quite a line long, often abundant on flowers, and which does much mischief to grain crops, particularly late-sown wheat, insinuating itself between the chaff and the immature grain, which it causes to shrivel; also at an earlier period causing the abortion of the ear, by puncturing the stalks above the joints and sucking the juice. The C. T. is of a shining pitchy black, the body long, the male wingless, the female having four narrow wings, which are fringed with long hairs; the larva is yellow, as is also the pupa, which is active. See THRIPS.

CORN WEE'VIL (*Calandra granaria*), a coleopterous insect of the family *Curculionidæ*, which although a small creature, not quite two lines long, is often extremely destructive to grain stored in granaries. It is much more common in the southern than in the northern parts of Europe. The perfect insect is of a dark chestnut or reddish pitchy color, with short oval wing-cases, but without wings, the thorax much marked with depressed dots, the head elongated into a proboscis, the antennæ bent at right angles. The female makes a little hole in a grain of corn, and deposits an egg in it, the larva feeds on the farina; and as a single female lays many eggs, and perfect insects are soon produced from them, the mischief, unless counteracted, extends very rapidly. To arrest it, however, has always been found extremely difficult; and the most successful method is said to be that of making a little separate heap of grain, which, being left unstirred, whilst the greater heap is stirred very frequently, soon becomes the refuge of the weevils, particularly if it is a heap of barley, of which they are fondest, although they will eat any grain, and there they are killed by boiling water.—Of the same genus are the Rice Weevil (*Calandra Oryzæ*), and a large South American insect (*C. palmarum*), an inch and a half long, the grub of which lives in the stems of palms, and is eaten as a delicacy both by Indians and Creoles.

CORNA'CEÆ, a small natural order of exogenous plants, containing about 40 known species, chiefly trees and shrubs, with a few herbaceous plants. The leaves are simple, without stipules; the flowers in heads, umbels, or corymbs. The calyx is 4-lobed or 4-toothed; the petals 4, equal, oblong, broad at the base, inserted into the upper part of the tube of the calyx; the stamens 4, alternate with the petals; the ovary is adherent to the tube of the calyx, 2—3-celled, crowned by a disk; the ovules solitary; the style filiform; the stigma simple; the fruit is fleshy and drupe-like. The C. are natives of the temperate parts of the northern hemisphere. The fruits of some are eatable; the bark and leaves of some are medicinal; some are valued as ornamental plants. CORNEL, DOGWOOD, AUCUBA, and BENTHAMIA are examples.

CORNA'RO, Lodovico, a Venetian nobleman, born 1467, is remembered on account of his instructive example of temperance. His constitution, naturally not strong, was greatly injured by intemperate eating and drinking, with other excesses; so that, when forty years of age, he appeared to have little hope of prolonged life. At this time he adopted strict rules of temperance both in meat and drink, which, co-operating with his general care of health and gentle exercises of various kinds, served to extend his life to nearly 100 years, as he died, according to the best authorities, in 1566. His old age was remarkably cheerful. To promote those habits which had proved so advantageous in his own case, he wrote, in his 83d year, his celebrated treatise, "Discorsi della Vita Sobria" ("Essay on Temperate Living"), which was first published at Padua in 1558, and has been translated into all European languages. The best English translation is one bearing date 1779.

CO'RNBRASH, a member of the Lower Oolite, consist chiefly of a rubbly cream-colored limestone in thin layers, always nodular and concretionary, each fragment having a deep-red coating. Occasional beds of clay occur interstratified with the limestone. The whole thickness of the group rarely exceeds 15 feet. The C. is extremely rich in Echinodermata and Mollusca, with the exception of Cephalopoda, the abundant Oolite genus Belemnites being unaccountably wanting.

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CO RNÉA, one of the coats of the eye; so called from its resemblance to horn (Lat. *cornu*). See EYE.

CORNEILLE, Pierre, the creator of French tragedy, was born June 6, 1606, at Rouen, where his father was an advocate. He himself studied for the legal profession. A love adventure, in which he became the rival of a friend, first prompted C. to write verses, and "Mélite," the comedy founded on this incident, was performed with success in 1629. It was quickly followed by other dramatic pieces: "Clitandre," "La Veuve," "La Galerie du Palais," "La Suivante," and "La Place Royale"—all so successful that a special theatrical company was formed for the performance of C.'s pieces. In 1635 appeared his "Médée," a declamatory drama, written in imitation of Seneca. Cardinal Richelieu, who aspired to be the Mæcenas of the stage, kept in his pay a number of writers for whom he dictated plots, and wished to number C. among his retainers; but C. was so audacious as to alter the plan of a comedy, and thus lost the cardinal's favor. He now returned to his native place, where M. Chalon, once secretary to Maria de' Medici, suggested that he should turn his attention to tragedy. As the English drama was not known, or at least not relished at that time, beyond the limits of England, C. acquired the Spanish language that he might be enabled to study the Spanish drama, the only other of any consequence in Europe. The result was the "Cid" (1636), which was received with enthusiastic applause. Cardinal Richelieu alone seemed to find no merit in this drama, and induced the Academy to publish a critique in some respects unfavorable. In his next celebrated piece, "Horace" (1639), C. endeavored to vindicate his claim to creative genius, which had been questioned by his enemies; but "Cinna" (1639) has been regarded by some French critics as C.'s master piece, though others might be disposed to award this honor to "Polyeucte" (1640). In the "Mort de Pompée" (1641), though there is something dignified in the style, it occasionally passes into bombast. The comedy of "Le Menteur" (1642), partly taken from Pedro de Roxas, has natural truth and humor. C. now seems to have exhausted his resources, and his later pieces are almost all forgotten. Of his thirty-three dramas, only a few have kept their place on the French stage. Nevertheless, his countrymen call him *Le grand Corneille*, although Voltaire, who edited an edition of his works, and Laharpe have expressed themselves in some respects unfavorably regarding his genius. The faults of conception in several of his pieces were pointed out by the sharp criticism of Lessing. A. W. Schlegel also spoke in such a way as to provoke hot replies from the wounded pride of the French Littérateurs. C.'s chief merit lies in his dignity of style, and in a certain declamatory grandeur of sentiment, which his countrymen have been accustomed to consider truly epical, and which it is now impossible to convince them as nearly resembles rant as it does sublimity. C. died October 1, 1684. The best edition of his complete works was edited by Renouard (12 vols., 1817).—C.'s brother, THOMAS (born 1625—died 1709), also acquired a reputation as a dramatic writer.

CO'RNEL, or Corne'lian Cherry (*Cornus mas*); the *Cornus* of the ancients, a tree or shrub of 15—20 feet high, of the natural order *Cornaceæ*, a native of the middle and south of Europe, and of great part of Asia. It is not found wild in Britain, although it is common in shrubberies, and was formerly much cultivated as a fruit-tree, as it still is in Germany and other parts of Europe. It has oval leaves, and small yellow heads of flowers, which appear before the leaves in spring, and which abound in honey and are much frequented by bees. The fruit is oblong, a little larger than a sloe, shining, red, or rarely yellow or white. It is late in ripening, and until quite ripe is very austere; but when perfectly mellow, has an agreeable vinous acid taste: it is either eaten as it comes from the tree, or is made into a preserve, which is said to be tonic, and useful in diarrhœa. When gathered unripe, it is pickled like olives. It was formerly also fermented for a beverage. In Turkey, it is still much used in making sherbet. The wood of the C. is extremely hard and tough, and well adapted for those purposes of joiners and turners to which the size of the tree will admit of its application. It is used for making mathematical instruments.—DWARF C. (*C. Suecica*), a native of mountain-pastures and bogs throughout the north of Europe and in Britain, is a plant about six inches high, with creeping root, sessile ovate leaves, each stem producing a single umbel of a few purple flowers, followed by small sweetish red fruit, which is tonic, and has the power of remarkably in-

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creasing the appetite whence the plant has received a Gaelic name, signifying *Plant of Gluttony*.—Dogwood (q. v.) belongs to the same genus.

CORNE'LIUS, Peter Von, one of the first masters of the modern German school of painting, was born at Düsseldorf, 23d September 1787, and studied under Langer in the academy of his native town. When only 19 years of age, he painted some remarkable frescoes for the cupola of the old church of Nenss. Four years later, he gave still more unmistakable proofs of a creative fancy in his illustrations of Goethe's "Faust," and the "Nibelungen Lied." In 1811 he went to Rome. This journey exercised a profound influence on the whole of his future career. The great importance of the early masters became ever clearer to him as he studied their choicest productions. He gained a wide reputation, while at Rome, by two cartoons, "Joseph's Interpretation of the Dream," and Joseph's "Recognition of his Brethren." In 1819 he was called to Munich, and entered the service of the then crown-prince of Bavaria. Here he remained till 1841, and executed those grand works on which his fame mainly rests, and which may be divided into two classes, Pagan and Christian, the former of which comprises the large frescoes in the saloon of the Glyptothek, all illustrating stories of the Greek gods and heroes, as also representations of several Hesiodic myths, and of the various incidents of the Trojan war; while the latter, or Christian series, begun after the completion of the former in 1830, consists of frescoes on New Testament scenes, extending from the "Incarnation" to the "Judgment," and decorate the "Ludwig's Church" in Munich, which was built for the purpose of affording scope for the genius of Cornelius. The "Judgment" is the largest fresco in the world, larger even than Michael Angelo's "Judgment" in the Sixtine Gallery. In 1841, C. was invited by the king of Prussia to Berlin, where he was appointed director of the Berlin Academy. Among his productions in the Prussian capital are the frescoes for the Campo-Santo, or royal burial-place. Opinion is divided regarding the merits of Cornelius. By his own countrymen he is extremely admired; French critics, on the other hand, regard him as more a thinker than an artist, sacrificing to his conception both truth of color and expression. He is admitted to have been a profoundly creative genius, but *not* a painter. He formed, however, a numerous school, from which have gone forth many illustrious pupils; but he lived to see it losing hold on public sympathy. He died in the 80th year of his age, 6th March 1867.

CORNELIUS NEPOS. See NEPOS.

CO'RNET, a stop, or series of pipes, in an organ, intended to imitate the tone of an obsolete wind-instrument which has been superseded by the oboe.—The CORNET-A-PISTON, a modern wind-instrument of the trumpet kind, is generally made of brass, has two or three valves, and in brass bands takes the soprano and contralto parts. It was first introduced in France as an orchestral instrument. Its tones are less powerful, but far more easily manageable than those of the trumpet.

CORNET (Ital. *cornetta*, a small flag) was, until 1871, the lowest grade of commissioned-officer in the cavalry, equivalent to *ensign* in the infantry, his duty being to bear the standard. With the lieutenant, he assisted the captain in the daily duties connected with the troop to which he belonged. There were as many cornets in a cavalry regiment as there are troops. A C.'s commission used, in the days of "purchase," to cost £450; but much larger sums were habitually paid, varying according to the celebrity, or rather the fashionable character of the corps. The pay was 8s. per day, with 1s. or 1s. 6d. extra for field allowance. The half-pay varied from 2s. 6d. to 8s. 6d. The pay being utterly inconsistent with the price paid for the commission, none but wealthy men could enter the cavalry. In 1871, the rank was abolished, sub-lieutenants (who are merely probationary lieutenants) being substituted.

CORNE'TO, a town of Central Italy, about 12 miles north of Civita Vecchia, occupying a commanding eminence on the left bank of the Marta, and two or three miles from the Mediterranean, over which it has an extensive view. C. rose out of the ruins of the Etruscan city of *Turquinii*, and is enriched by some of its monuments. It was erected into a city by Eugenius IV. in 1432; but the picturesque old battlemented walls and towers which surround it are said to belong to an earlier period. During the faction-wars of the Guelphs and Ghibellines, this city maintained

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a firm allegiance to the popes. Pop. 5000. The remains of Tarquinii (perhaps the most interesting in existence to the student of Etruscan history, as it is from the tombs here that most of our knowledge as to the games, costumes, and religious customs of this remarkable people has been derived) lie about a mile and a half from Corneto. The Necropolis of Tarquinii covered 16 square miles, and it has been estimated on high authority that it could not have contained less than 2,000,000 tombs. Of this vast number, some 2000 have been opened within recent years. Among the most noteworthy of these are the Grotta delle Iscrizioni, the Grotta delle Bighe, Grotta del Barone, Grotta Francesca, Grotta del Cardinale, Grotta del Triclinio, and Grotta della Querciola. Treasures from this mine of Etruscan wealth, as it may be called, enrich the British Museum, and other important collections in Britain and on the continent.

CO'RNICE. In classical architecture, the C. is the uppermost member of the entablature, surmounting the frieze. Each of the orders has its peculiar C.; but these, with their relation to the other portions of the entablature, will be better understood when explained in conjunction with that term. See ENTABLATURE. In the Gothic styles, the form of the C. varies greatly. "In the Norman style," says Parker, "a plain face of parapet, slightly projecting from the wall, is frequently used as a C., and a row of blocks is often placed under it, sometimes plain, sometimes molded or carved into heads and other ornaments, when it is called a corbel table." These blocks have commonly a range of small arches over them. In some cases a small plain string is used as a cornice. The corbel table continued to be used as a C. in the Early English style; but it was generally more ornamented than in the Norman, the arches being commonly trefoils and well moulded. The blocks are frequently ornamented with a head, or other figure characteristic of the style. Sometimes a range of horizontal moldings is placed above the arches of the corbel table, and sometimes the C. consists of simple moldings, without any corbel table.

The term C. is also used, in a general sense, to signify any horizontal moulded projection, terminating a building, or the component parts of a building. It is in this sense that we speak of the C. of a room.

CORNICHE. See RIVIERA.

CO'RNO, Monté, or Gran Sa'sso D'ita'lia, a mountain in the Southern Italy, the culminating peak of the Appenines, in lat. 42° 27' n., long. 13° 38' e. It has an elevation of 9591 feet; and its summit is covered with snow at all seasons.

CORNS are small hard growths, resulting from an increase in the thickness of the cuticle or epidermis, which is generally caused by the irritation of some excessive pressure or friction on the part. The occur most commonly on the toes as a result of tight shoes. Three varieties of C. are described, viz.—1. *Laminated Corns* or *Callosities*, in which the hardened cuticle is arranged in layers, frequently of a dark-brown color, from the effusion of blood in the deeper layers. 2. *Fibrous Corns* (clavi), which are not only fibrous in their early stages, but, as time goes on, sink into the skin, sometimes producing great pain. Frequently, a bursa, or small bag, is formed beneath, to protect the tender subjacent tissues, and if this bursa should inflame, matter speedily forms, and the pain and constitutional irritation become severe; at other times, the pressure may cause absorption of the ends of bones, and serious alterations in the condition of a joint. The duty of the chiropodist is to dislodge the imbedded peg of hard cuticle from its socket. Should he cut it across, the fibrous arrangement will present the appearance of "roots," a popular delusion of great value to itinerent corn-doctors. 3. *Soft C.* occur between the toes, and cause much annoyance; they are generally small, and being constantly bathed in perspiration, the cuticle does not harden, as in the other varieties. They sometimes give rise to painful ulcerations.

The treatment of C. consists in the removal of all undue pressure or friction, either by removing the shoe altogether or protecting the corn by surrounding it with a border of some soft material, as Amadon (q. v.) or soft leather; or the hardened cuticle may be softened by the application of some alkaline lotion, and then scraped or filed away; or it may be extracted, as before mentioned. A lotion of soda or potash is often found very useful. The cuticle composing a soft corn should be clipped off with scissors, and a smal piece of cotton-wool be placed be-

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tween the toes. In all serious cases, application should be made to a respectable chiropodist.

C. affect horses as well as men. In the foot of the horse they occur in the angle between the bars and outer crust, and consist in a bruise of the sensitive secreting sole. Two forms of feet are especially subject to them—those with deep narrow slanting heels, in which the sensitive sole becomes squeezed between the doubled up crust and the shoe; and wide flat feet which, by the senseless cutting away of the bars and outer crust, allow the delicate interior parts to be pressed with all the force of the animal's weight on the unyielding iron shoe. Serum and blood are poured out, whilst the secreting parts, being weak and irritable, produce a soft, scaly, unhealthy horn. C. constitute unsoundness; cause a short, careful, tripping gait; are the most frequent source of lameness amongst roadsters; abound in badly-shod horses, especially those with the kind of feet alluded to: and usually occur in the inside heel of the forefeet, these being more especially subjected to weight, and hence to pressure. The discolored spot indicating the recent corn must be carefully cut into with a fine drawing-knife; any serum or blood is thus allowed free vent. If the bruise has been extensive, a poultice will have the twofold effect of allaying irritation, and relieving the sensitive parts by softening the hard unyielding horn. When the injury has been of some standing, and soft faulty horn is secreted, a drop of diluted nitric acid may be applied. On no account must the bars or outer crust be removed; they are required for bearing weight, which may be further kept off the injured part by the use of a bar-shoe. In horses subject to C., keep the feet soft by dressing with tar and oil or any suitable emollient; pare out the C. every fortnight; use a shoe with a wide web on the inside quarter, and nailed only on the outside; and, if the sole is thin and weak, employ leather pads.

CO'RNSTONE, a peculiar—often mottled—limestone of the Old Red Sandstone formation of Herefordshire, Shropshire, and South Wales.

CO'RNU AMMO'NIS. See AMMONITES.

CORNUCO'PIA (Lat. *cornu*, a horn, and *copia*, plenty). The horn of plenty—regarding the origin of which several fables are told by the ancient poets—is generally placed in the hands of emblematical figures of Plenty, Liberality, &c., who are represented as pouring from it an abundance of fruits, corn, &c. It is frequently used both in architecture and heraldry. On the arms of banks, and other public institutions, it is often represented pouring forth coins.

CO'RNWALL, a maritime county, forming the south-west extremity of England, and the south-most county in the British Isles. It is a peninsular right angled strip of land, with the apex in the south-west, and is bounded on the e. by Devonshire, with the Tamar between, on the n. and w. by the Atlantic, and on the s. by the English Channel. From its Devonshire boundary it runs south west, narrowing to the Land's End, the west-most part of England, in 5° 41′ 31″ w., it then bends north to Penzance, whence it sweeps round in a south-eastern direction to the Lizard Point, the southmost part of England, in 49° 57′ 30″ s. From thence it follows a north-eastern course to Plymouth Sound. Greatest length in a straight line from Welcomb to the Land's End, 81 miles; extreme breadth from Welcomb to Rame Head, 46. Area, 1365 sq. miles, of which seven-eighths are arable, meadow, or pasture. The surface is irregular, with rapid ascents and descents. A ridge of rugged, bleak, moory hills, rising to the height of from 800 to 1300 hundred feet, run south-west through the centre of Cornwall. From this ridge the country slopes, and the streams flow on each side. The hill valleys are longer and wider on the south than on the north side of this ridge, and some of them are picturesque with corn, wood, orchards, rivulets, and meadows. The coasts are bold and rocky, and indented with many headlands and bays. The chief indentations are Plymouth Harbor, Falmouth Harbor, one of the finest in Britain, and Mount's Bay between Lizard Point and Land's End. Twenty-four miles off the latter point are the Scilly Isles. On the north-west coast occur shifting sands, often in hills several hundred feet high. The chief rivers are the Tamar, which runs 59 miles along the east border, 19 miles being a tidal estuary, ending in the noble roadstead of Plymouth Sound; the Fal, which runs 20 miles south, 10 miles being tidal, and ends in the fine harbor of Carrick Road, near Falmouth;

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and the Allan or Camel, 99 miles long, 8 being navigable. Woods, meadows, arable land, and 140 parish churches, are said to have been submerged between Mount's Bay and the Scilly Isles. Old red sandstone, the "killas" of the miner, covers above three-fourths of C., and is intersected by three large masses of granite in the interior of the county, with one around Land's End, and by porphyry veins and dikes, some being 50 or 80 fathoms thick, and also by limestone beds. The granite on the hills is often worn by the weather into the form of prismatic, cubical, or spheroidal blocks, piled in gigantic cairns. These blocks sometimes form Logging or Logan Stones. Copper and tin veins, generally 1 to 3 feet thick, but varying from the thickness of paper to 30 feet, and of unknown depth, run through the granite and sandstone, generally from east to west. Tin also occurs in the gravel; and lead, silver, cobalt, and antimony veins in the sandstone. Lizard Point consists of mica-slate, with soapstone veins, and chinastone; and the country around, of serpentine, hornblende and diallage rocks. Chinastone, or decomposed felspar of granite, is found near Launceston, and is a chief ingredient in retorts and crucibles made in Staffordshire. In 1874, C. had 78 copper-mines, 16 lead-mines, and 153 tin-mines, producing 2770 tons of copper, 2337 tons of lead, and about 9000 tons of tin. Of iron ore, 45,000 tons were produced. C. yields ⅓ of the copper and 9-10ths of the tin raised in the British Isles. The great mining district extends from Dartmoor, in Devon, to Land's End, the veins and lodes chiefly occuring in granite, or killas.

The climate is mild, especially in winter, but damp, with almost daily rain. Snow rarely lies above a few days. Southwest winds prevail for nine months in the year, and furious gales are frequent. Some plants of the south of Europe, as the myrtle, tamarisk, and balm of Gilead, flourish in the open air, but fruits do not ripen well. The soil is light, gravelly, or slaty. The land is generally barren in the mining tracts, but fruitful in the valleys and on the coast. The chief crops are barley, wheat, oats and potatoes, but harvest is generally later than in the inland counties. Near Penzance, however, two crops of potatoes are got yearly. C. is far more a mining than an agricultural county. The pilchard fishery is very profitable, and employs a large number of people from July to September. The only exports are mining produce and fish. Landed property is much divided. The total area of C. is 873,600 acres, or 1365 square miles. The census of 1871 gave a population of 362,-343. About 30,000 persons are employed in the mines. For electoral purposes C. is divided into an eastern and a western division, each of which returns two members to Parliament. C. has ancient British antiquities, such as rude upright stone blocks, single and in lines, circles, barrows and cromiechs. Many Roman coins, &c., have been found. There are many Saxon camps and earth-works. C. and the Scilly Isles were the Cassiterides, or tin isles of the Phœnicians and Greeks. Vortigern made C. a kingdom in 446 A.D. The West Saxon kings subdued it in 650. The Saxons and Danes overran it in the 9th and 10th centuries. C. has remains of ancient castles and monasteries. It was erected into a duchy in 1329, in favor of the Black Prince, eldest son of Edward III., who, with the succeeding Princes of Wales, had immense revenues from the county. The dukedom is still held by the Prince of Wales, who derives from it a revenue of £80,000 and appoints the sheriffs. The Cornish tongue, a Celtic dialect, became extinct only in the present century.

CORNWALLIS, Caroline Frances, was born on the 12th July, 1786, and was the younger daughter of the Rev. William Cornwallis, rector of Whittersham and Elam in Kent. Her childhood was precocious; but she escaped the usual fate of precocious children. She lived to a good old age; she was even more remarkable as a woman than as a child; and her mind was growing, if not in vigor, in boldness and freeness, even to the last. Her character, as well as her intellectual powers, appear to have been early developed; and from expressions in her mother's Diary, we learn that her premature sensibility at the age of seven caused her relatives no little concern. When she was a little older, she began to produce literary works; and the writing of histories, poems, commentaries, and essays, though not pursued to the exclusion of the ordinary interests of her age, appears to have occupied much of her time, and to have been her chief delight for several years. Some specimens of her juvenile compositions have been included in a volume of her "Letters and Remains," published in 1864. In character, and in respect of the tastes and abilities which they display, they certainly are very remarkable as the productions of a child. Notwithstanding this early promise, Miss C. was not destined to be an early authoress. She

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was brought up in the decorous life of an English country parsonage; she was sensible of, and at first, perhaps, was not unaffected by, the prejudice against female authorship which prevailed thirty or forty years ago. It was not till she was getting old that she began to publish books, and even then she was careful to keep her authorship a secret.

She received the school education usually given to young ladies in her time; a worthless education, as she afterwards thought. She was encouraged by her mother and other friends in supplementing it by severer and more useful studies; but the ill-health of her father, which imposed many duties upon her, and the state of her own health, were considerable obstacles to her progress. Gradually, however, she acquired a thorough knowledge of Latin and Greek, and a considerable knowledge of Hebrew; and made herself conversant with nearly every study which occupies the more thoughtful of men—with philosophy, theology, history, natural science, social science, politics, and even law. In her latter days, her knowledge of most of these subjects was only surpassed by that of men who had taken them for their specialty. From an early age she carried on a correspondence with many persons whose intimacy was calculated to stimulate and aid her; and a selection from her "Letters" has been published. They are often intrinsically valuable and interesting; and, moreover, they present a curious picture of the progress of her mind and the development of her opinions. In style, they are always excellent, and the subjects treated are very various, and seldom ephemeral. Theology, philosophy, history, politics, and social questions afford the themes she most often discussed with her correspondents. To these "Letters" we are indebted for what little has been made known to us of her life; Miss C. having desired that her life should not be written, and having carefully destroyed the papers which might have supplied the materials of a memoir. As regards religion—the great interest of her life—we learn from these "Letters" how, under the influence of enlarged knowledge and reflection, she gradually drifted away from the narrow orthodoxy in which she had been brought up, and adopted views which some would call more enlarged and rational, others latitudinarian. It is to the study of the Greek Fathers, and to the influence of a long residence in Italy, which began in 1826, that she ascribed the complete change which took place in her religious opinions. It is right to say, that while she was bold and fearless in accepting beliefs far removed from those of her age and country, her faith in Christianity became stronger instead of weaker, and that she was always careful not to wound the honest opinions and prejudices of others. Among the most esteemed of her correspondents was Sismondi, who is said to have made her an offer of marriage when she was about 20 years old. The offer was declined, but without causing any abatement of friendship or admiration on either side.

Her first work, "Philosophical Theories and Philosophical Experience, by a Pariah," appeared in 1842. It was the first of a series entitled "Small Books on Great Subjects," which she had formed the idea of writing with the help of a few friends. Of the 20 volumes of this series which appeared between 1842 and 1854, nearly all—all the most important—were written by Miss Cornwallis. The subjects discussed were very various—the Connection of Physiology and Intellectual Science, Ragged Schools, Grammar, Criminal Law, Chemistry and Geology, Greek Philosophy, and the History and Influence of Christian Opinions. The works in which the last-mentioned subject was treated—"The State of Man before the Coming of Christ" (1 vol.), and "The State of Man after the Coming of Christ" (3 vols.)—were the most important of the series. She had designed to add to them one more volume—a Survey of the Present Condition of England, Social, Political, and Religious. But this was never completed. The series attracted much attention in this country, and still more in America; and the books in which Christianity and its influence were considered were so judiciously written, that, though presenting a system of thought and belief entirely different from our orthodox Christian teaching, they were favorably received by many of every religious party. These are still the best short and popular account we have of subjects of great interest and importance, of which the majority of the clergy even were profoundly ignorant twenty years ago. In illustration of the ignorance which prevailed amongst Anglican clergy at a time still recent, Miss C. used to say that she once met a clergyman who had never heard of the Fathers; and that among a multitude to whom she applied

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for information about their writings, not one knew anything about them. Besides the "Small Books on Great Subjects," Miss C. published in 1847, "Pericles, a Tale of Athens," which good judges have declared to be an admirable picture of Athenian life; and in 1853, she published a prize essay on Juvenile Delinquency.

From an early period of her life, her health had been infirm; in her later years, it was very precarious, and she was for the most part confined to her bed. She lived latterly at Ildwells, near Tunbridge Wells. She died there on January 8, 1858. A voluminous author, her name was at her death unknown to the world, and it remained unknown until the publication of her "Letters and Remains" in 1864. She had two reasons for making a secret of her authorship. First, there was a strong prejudice against female authorship in her young days, and even when she began to write; and she feared not the ridicule or scorn, but the neglect which might await her books were it known that they were written by a woman. She wrote in the hope of doing some good, and she concealed her name, that her purpose might not be frustrated. Secondly, she wished to shew the world what the female intellect was capable of, and the concealment of her name made her secure of impartial criticism. She believed firmly that the intellects of women were not inferior to the intellects of men, and that their apparent inferiority was entirely the result of inferior training. She regarded the praises bestowed upon her books, the acknowledgement of their originality, accuracy, and vigor, as a tribute not to herself but to her sex. If the books do not prove the intellectual equality of the sexes, they certainly prove that Miss C. was a very exceptional woman. We know from her letters and from the testimony of her friends, that her masculine brain and a great stock of erudition did not prevent her from affording a beautiful example of the graces and charms of the feminine character.

CORNWA'LLIS, Charles, Marquis, an English general and statesman, son of the first Earl Cornwallis, was born December 31, 1738, and was educated at Eton and Cambridge. He served as aide-de-camp to the Marquis of Granby in the Seven Years' War; in 1776 was made a colonel, and four years later, governor of the Tower of London. Though personally opposed to the war in America, he accompanied his regiment thither, and with an inferior force gained victories over General Gates at Camden in August 1780, and over General Greene at Guilford, March 1781. In the same year, however, he was forced to surrender with all his troops at York Town, Virginia. This disaster proved the ruin of the British cause in America, and was the occasion of much dissatisfaction, resulting in a change of ministers at home. C., however, who was high in favor with the king, escaped censure. In 1786, C. was appointed governor-general of India, and commander-in-chief, and in this double capacity distinguished himself by his victories over Tippoo Saib, and by his unwearying efforts to promote the welfare of the natives. His measures, however, were far from answering the purposes he intended. He returned from India in 1798, when he was raised to the rank of Marquis. Appointed lord-lieutenant of Ireland in 1798 during the time of the Rebellion, he succeeded in putting it down, and in establishing order in a manner that gained him the good-will of the Irish people. As plenipotentiary to France, he negotiated the peace of Amiens. Reappointed governor-general of India in 1804, he died at Ghazipore, in the province of Benares, in Oct. 1805, on his way to assume the command of the army in the Upper Provinces. As a statesman or warrior, C.'s talents did not rise much above respectable mediocrity, but he was upright, diligent, and humane in a more than ordinary degree.

CORO'LLA, in Botany, the inner floral envelope of the greater number of phanerogamous plants; the second of those whorls of modified leaves which form the flower (q. v.). It is in the C. that fine colors and the greatest delicacy and beauty of the flower are in general chiefly displayed. The modified leaves of which it is composed are called *petals*, and are very various in form and number. They are also in very many plants united into a tube at the base, when the C. is said to be *monopetalous*; and this union often extends through their whole length, leaving their number to be discerned merely in the teeth in which the C. (bell shaped, funnel-shaped, tubular, &c.) terminates. The petals of a flower are either similar, when the C. is said to be *regular*, or they differ in form, often very widely, when it is called *irregular*. They not unfrequently assume remarkable and even grotesque forms.

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Many petals have appendages of various kinds, as *scales*, *nectaries*, *spurs*, *coronæ* or *crowns*, &c. Petals often consist of a *limb*, or expanded portion, and a *claw*, the narrower part, which is covered by the calyx, and by which the petal is attached, but sometimes the claw is wanting or obsolete, sometimes it is united with the tube of the calyx, so that the petals appear to rise out of the Calyx. See CALYX and PERIANTH.

CO'ROLLARY, a proposition the truth of which appears so clearly from the proof of another proposition as not to require separate demonstration.

COROMA'NDEL COAST, often vaguely taken as the whole of the west shore of the Bay of Bengal, extends, in its proper acceptation, from Point Calimere, in lat. 10° 17′ n., long. 79° 56′ e., to Gondegam, in lat. 15° 20′ n. long. 80° 10° e. It is pretty nearly co-extensive with the districts of Tanjore, Arcot, Chingleput, and Nellore, comprising, along with Madras and Pondicherry, the grand battle-field of last century between England and France in India. With various estuaries and inlets, it is yet commercially of every little value, not presenting a single safe place of refuge for large vessels. So shallow, moreover, is the water for a considerable distance from the land, that ships of any size are obliged to lie several miles off; while the intermediate space, or at least that belt of it that is nearest the beach, presents a surf in which no ordinary boat can live—the only safe craft being the native catamaran (q. v.).

CORO'NA, or Crown, in Botany, an appendage of the corolla in some flowers; sometimes assuming the appearance of an interior corolla very different from the true corolla, and either divided into parts resembling petals, or consisting only of one piece, and surrounding the organs of fructification like a monopetalous corolla; sometimes assuming very peculiar forms. It is often difficult to determine whether the C. is properly to be regarded as belonging to the row of petals, or to that of stamens. The C. was included by Linnæus under the very comprehensive term nectary. A familiar example may be seen in *Narcissus*; forms very different may be seen in *Stapelia*, and other genera of the natural order *Asclepiadaceæ*.

CORONA (Lat. a crown), in Architecture, the drip, or lower member of the projecting part of a classical cornice. See ENTABLATURE. The term C. is also applied to the apse or semicircular termination of the choir, especially by ecclesiastical writers. Hence we hear of "Becket's crown," at Canterbury. C. is also applied in ecclesiastical nomenclature, to a chandelier, in the form of a crown or circlet, suspended from the roof of a church, or from the vaulting of the nave or chapels, to hold tapers which are lighted on solemn occasions.

CORONA BORE'A'LIS, a small and bright constellation near Hercules.

CORONA'TION. The use of crowns in antiquity, as a mark either of honor or of rejoicing, will be explained under CROWN. It was, no doubt, as an adaptation of this general custom to a special use that the practice of placing a crown on the head of a monarch at the commencement of his reign was introduced. The practice is very ancient, as we may learn from the fact that Solomon and Ahaziah were crowned; and there is probably scarcely any country in which it has not been followed in one form or another. Generally it has been accompanied by what was regarded as the still more solemn rite of anointing with oil, a ceremony which, from the times of the ancient Hebrews to our own, has been peculiarly significant of consecration or devotion to the service of God. The term employed for C. in the Saxon chronicle, "gehalgod," is hallowed or consecrated; and it would seem that the ceremony as then performed at Kingston-on-Thames or Winchester, was in all essentials the same as that which now takes place in Westminster Abbey. A copy of the Gospels is still in existence amongst the Cottonian MSS. in the British Museum, which is believed to be the identical copy on which the Saxon kings were sworn. Detailed accounts of many English coronations, from Richard I. downwards, have been preserved. They will be found enumerated, along with those of the German emperors, the kings of France, emperors of Russia, &c., in Bohn's "Cyclopædia of Political Knowledge;" and much more fully, along with much interesting information on the subject generally, in "Chapters on Coronations" (Lond. 1838).

CORONATION GULF, an inlet of the Arctic Ocean, forms the south-east part

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of the landlocked and isle-studded bay that receives the Coppermine. Lat. 66° 30'—68° 30' n., long. 109°—110° w.

CORONATION OATH. The form in which the limitations imposed on the monarch were defined by the nation and accepted by him, was probably from the first something equivalent to a coronation oath. Up to the period of the revolution, however, the C. O., like all the other guarantees for popular liberty, admitted of being tampered with; and there is in existence (Cottonian MS., Tib. E. viii.) a copy of the oath sworn by Henry VIII., interlined and altered with his own hand.

To obviate the possibility of such proceedings for the future, the existing C. O., altered only in consequence of the subsequent unions between England and Scotland, and Great Britain and Ireland, was fixed by stat. 1 Will. and Mary, st. 1., c. 6. It is to the following effect, and thus administered. The Archbishop of Canterbury demands of the king (or queen): "Sir (or Madam), is your Majesty willing to take the oath?" and on the king answering, "I am willing," the archbishop ministereth these questions; and the king, having a copy of the printed Form and Order of the Coronation Service in his hands, answers each question severally, as follows:

Archb. Will you solemnly promise and swear to govern the people of this United Kingdom of Great Britain and Ireland, and the dominions thereto belonging, according to the statutes in parliament agreed on, and the respective laws and customs of the same?

King. I solemnly promise so to do.

Archb. Will you, to your power, cause law and justice, in mercy, to be executed in all your judgments?

King. I will.

Archb. Will you, to the utmost of your power, maintain the laws of God, the true profession of the Gospel, and the Protestant reformed religion, established by law? And will you maintain and preserve inviolably the settlement of the United Church of England and Ireland, and the doctrine, worship, discipline, and government thereof, as by law established within England and Ireland, and the territories thereunto belonging? And will you preserve to the bishops and clergy of England and Ireland, and to the churches there committed to their charge, all such rights and privileges as do, or shall appertain unto them, or any of them?

King. All this I promise to do.

The sovereign then goes to the altar, and, laying his hand upon the Gospels, takes the following oath: "The things which I have heretofore promised, I will perform and keep, so help me God."

The sovereign then kisses the book, and signs the oath.

The passage in the oath in which the sovereign guarantees the privileges of the Church of England, is framed in conformity with the "Act for Securing the Church of England as by Law Established," which is declared to be a fundamental and essential part of the Treaty of Union, and which was inserted accordingly in the act by which the Treaty of Union was finally ratified. The passage in the act which provides for the security of the Church of Scotland was framed in conformity with an "Overture for an act for security of the Church"—of which a copy will be found in the Appendix to Defoe's "History of the Union," p. 617. It is to the effect that, "after the decease of her present Majesty (whom God long preserve), the sovereign succeeding to her in the royal government of this kingdom shall, in all time coming (not at the cornation), *at his or her accession to the crown, swear and subscribe* that they shall maintain and preserve the foresaid settlement of the true Protestant religion, with the government, worship, and discipline of this Church, as above, (this is, by the previously recited act, 1 Will. and Mary, c. 5) established, inviolably." The security of the Church of Scotland is thus provided for, by what may be called an accession oath, even during the period which must intervene between the accession of the sovereign and his coronation, when he is not bound, by oath at least, to the maintenance of the other branches of the constitution.

CORONE'LLA, a genus of non-venomous serpents of the family *Colubridæ*, of a small size, having a somewhat compressed and generally pentagonal body, and rather long conical tail. They inhabit the warm and temperate parts of the world. One species, *C. lævis*, is found in the centre and south of Europe.

CO'RONER (Lat. *coronator*, *corona*, a crown), a very ancient officer, in England,

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at the common law. He is mentioned in a charter of King Athelstan, 905 A. D.; and the office, like much of the common law, is acknowledged to be of Saxon origin. The name is derived from the fact, that the C. has chiefly to do with pleas of the crown. In this light, the Lord Chief-Justice of the Queen's Bench is the principal C. in the kingdom, and may exercise jurisdiction in that capacity in any part of England. There are, however, particular coroners for every place in England, and in some counties, three or four, or even more. They were formerly paid by fees on each inquest, but now (23 and 24 Vict. c. 116) by salary paid out of the county rate. The C. is chosen for life, and the election rests with the freeholders of the county or district. A C. may, however, be dismissed by the Lord Chancellor for inability or misbehavior in his office. By the statute of Westminster the first (3 Edw. I. c. 10), it was enacted that none should be chosen but lawful and discreet knights; and in the time of Edward III., there is an instance of a man being removed from the office because he was merely a merchant. Subsequently, it was thought sufficient if a man had lands enough to entitle him to be made a knight; and Blackstone complains that in his time it had come to be sought for the perquisites, and not for the honor of serving the country. This motive has now ceased. The C. is now usually a professional man, frequently an attorney or a medical man.

The office of C. is to some extent the only one in England charged with the investigation of crime. Where the C. cannot act, there is no authority to examine witnesses until a suspected person has been actually charged or accused before a a magistrate. But even the C.'s duties are very limited, and little is added to the statute 3 Edw. I. The C. can inquire only into the causes of violent or sudden death, and into these only when the body has been found. When such a death happens, it is the duty of the constable to give notice of it to the C., who then summons a jury from the body of the county for the purpose of making an inquisition into the matter. The C. presides over the inquisition, and the court thus constituted is a court of record. The jury consists of twelve men at least, who are sworn and charged by the C.; and the verdict must be of twelve. By 6 and 7 Vict. c. 12, it has been enacted that the inquest shall be held before the C. in whose district the body shall be "lying dead." If any be found guilty by such inquisition of murder or other homicide, the C. is to commit them to prison for further trial, and is also to make inquiry concerning their lands, goods, and chattels (which are forfeited thereby), if not otherwise known; and he must, moreover, certify the whole of this inquisition under his own seal and the seals of the jurors, together with the evidence thereon, to the Court of Queen's Bench or the next assizes. The accused may thereupon be put on his trial without other indictment. By 6 and 7 Will. IV. c. 89, the C. is empowered to summon, and by 1 Vict. c. 68 to pay, medical witnesses, in place of referring them for payment to the church-wardens. The sums allowed are one guinea for a simple examination, and two guineas if a *post-mortem* examination of the body has been made. By 6 and 7 Vict. c. 83, coroners are empowered to appoint deputies in case of absence from illness or other reasonable cause. 9 and 10 Vict. c. 37 regulates the duties of the C. and the expenses of inquests in Ireland. Another branch of the C.'s office is to inquire concerning shipwrecks and treasure-trove; but this has been nearly superseded by the provisions of the Merchant Shipping Act, 1854. He is a conservator of the king's peace, in which capacity he is mentioned in one of the oldest treatises on the common law ("Mirror," c. 1, s. 3). As such, he may cause felons to be apprehended, whether an inquisition has found them guilty or not. The C. has likewise ministerial functions as the sheriff's substitute in executing process in suits in which the sheriff is related either to the plaintiff or defendant. Latterly, the office of C. has been the subject of consideration, with a view to certain reforms of administration. In many cases, it is alleged that the C. makes a job of his office, trumps up cases, and acts vexatiously at variance with the warrants of magistrates. Coroners or crowners, as they were also called in England, are mentioned in many old Scottish statutes; and there is no doubt that the office, as well as that of alderman and mayor, existed in those parts of the country that were peopled by persons of Teutonic race. But it was abolished or fell into desuetude, probably in consequence of the succession war and the French connection; and in Scotland the duties are now chiefly performed by an officer appointed by the crown, styled the Procurator-fiscal (q. v.).

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CO'RONET. See CROWN.

CO RPORAL, more properly *Caporal*, from the Italian *capo di escadra*) is, so far as concerns the British army at the present day, the grade next below non-commissioned officers. When the regiment is formed as a corps, he has no function different from the private soldier. In barracks or camp, however, he exercises certain disciplinary control over the privates. At present, in the British army, there are 32 corporals to each regiment of cavalry, and 40 for each infantry battalion. They receive pay varying from 1s. 3d. to 2s. 5d. per day. The lance-C. is an assistant-C., who remains, however, on private's pay; he wears one *Chevron* (q. v.) on his arm, and two when he rises to the rank of corporal.

On shipboard, there is a ship's corporal, a petty officer under the master-at-arms; to aid in teaching the seamen the use of small arms, to guard against the smuggling of spirits on board, to extinguish the fires and lights at a given signal, and to keep order below at night.

CORPORAL (Lat, *corpus*, a body, because of the belief that the bread and wine are the body and blood of our Saviour), a name given to the cloth with which the minister covers what is left of the consecrated elements in the Lord's Supper until the service is concluded. It is also called the *Pall*, and its use is of the highest antiquity.

CORPORAL PUNISHMENTS. See FLOGGING.

CORPORA'TION. This, in England, is either aggregate or sole. A C. aggregate is a society of persons authorised by law to act as one person, and to perpetuate its existence by the admission of new members. Without such legal authority, the acts of the society would be regarded only as the acts of the individuals, and the property of the society would descend to the heirs of the individual members. A C. sole consists of one person, and his successors, who are by law invested with the same capacities as a C. aggregate. The sovereign is a C. sole, and so is a bishop and the vicar of a parish, for these in the eye of the law never die, and each successive holder of the office takes the property belonging to it; neither by conveyance nor by ordinary succession, but is vested in it by his mere holding of the office.

A C. could formerly be established only by charter from the crown or act of parliament, unless, indeed, it existed by immemorial prescription; but of late years the exigencies of commerce have led to the passing of various enactments, by compliance with which any society of persons may acquire for themselves the character of a corporation. The particulars of these will be considered under the title JOINT-STOCK COMPANIES. A C. always receives a corporate name, by which it sues and is sued, and it must possess a common seal, the affixing of which is the only competent way of affixing the signature of the corporation. The majority of the members of a C. are entitled to act in its name, and may, by a by-law, even delegate—except in the case of municipal corporations—the power of acting in its name to a certain number of its members. For the acts of the C. none of its members are personally liable. A C. may hold lands—subject to the statutes of Mortmain (q. v.)—and may be possessed, if a C. aggregate, of chattels; but a C. sole has not this privilege, unless it be the representative of a number of persons for whose benefit the chattels are held. But no C. can be either a trustee proper or an executor.

Corporations, whether aggregate or sole, are divided into ecclesiastical and lay, and the lay are subdivided into civil and eleemosynary. The ecclesiastical are such as are composed wholly of clergymen, in their ecclesiastical capacity, and are chiefly for the purpose of holding ecclesiastical property. Civil corporations include municipal corporations, the universities, the colleges of physicians and surgeons, learned societies, and many trading companies incorporated. Eleemosynary corporations are for the administration of funds for charitable and pious purposes, such as hospitals, the colleges, in universities, &c. An important consequence of these distinctions, is the effect it has on the right of *visiting* a C., or exercising a legal superintendence over its proceedings. The crown is the visitor of the archbishops, each archbishop is the visitor of his suffragan bishops, and each bishop is the visitor of all the ecclesiastical corporations in his diocese. Civil corporations have no visitor, but the Court of Queen's Bench is the authority entitled to restrain and direct them. Eleemosynary corporations are visited by the founder and his

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heirs, or such persons as the founder appointed to be visitors; and in default of such persons, or of the founder's heirs, the Court of Chancery acts as visitor. Hospitals, if of ecclesiastical nature, are, however, subject to the visitation of the bishop.

A C. may be dissolved by the death of all its members, or of such number as leaves not enough to make new elections in the way the charter requires; by forfeiture of the charter, through breach of its conditions; by surrender of the charter; or by act of parliament. In all such cases, the lands of the C. revert to their several donors, and the debts due by or to the C. are extinguished.

Municipal corporations, formerly dependent on special charter alone, are now made uniform, and regulated by the 5 and 6 Will. IV. c. 76, and some subsequent acts. See MUNICIPAL CORPORATION.

As to public corporations in Scotland, see BURGH, TOWN COUNCIL, FRIENDLY SOCIETIES; and as to private corporations for trading purposes, see BANK, LIABILITY (limited), PARTNERSHIP.

CORPS D'ARMÉE, in the military system of the greater continental European states, is an organization of the forces in the time of peace. The whole military strength is divided into several corps, each complete in itself as an army, with everything needful for service, staff and artillery park included. The English army is too small to be divided into corps. In the French system, a military force exceeding 100,000 men is regarded as being too large for one army, and is therefore divided into two or more corps. The immense military force of Russia is divided into ten or twelve distinct corps, which, in times of peace, are quartered in widely distant provinces of the empire. Austria and Germany, in like manner, maintain many corps in their several states or governments.

CO'RPSE-CANDLE. See CANDLE.

CO'RPUS CHRI'STI, or Be'net College, Cambridge, was founded by two guilds or fraternities of townspeople—the guild of Corpus Christi, who had their prayers at St Benedict Church; and the guild of the Blessed Virgin, who prayed at St Mary's. These were united in 1352, and a small college erected by them. Archbishop Parker added largely to the endowments of this college, and bequeathed to it his valuable manuscripts, amongst which are the only authentic manuscript copies of the Thirty-nine Articles of the Church of England. Of the 12 fellows, all except 4 must take holy orders. There are thirty-one scholarships, some of considerable value, given to the students who most distinguish themselves at the annual examinations. Among the eminent men of this college were Hugh Latimer, Archbishop Parker and Tennison, Fletcher the dramatist, and Gough the antiquary.

CORPUS CHRISTI, Oxford. This college was founded in 1516 by Richard Fox, Bishop of Winchester, under a licence from King Henry VIII. The statutes were issued in 1517. The foundation consisted of 20 fellows and 20 scholars; of whom the fellows were to be elected from the scholars, while the scholars were to be elected from certain specified counties. Two peculiarities marked this foundation. First, the usual rules of life and discipline were enforced with peculiar severity; and second, the object of the college was expressly connected with the studies of the age. Classical literature was for the first time distinctly mentioned. The subjects of the lectures were enjoined to be, not the old routine of divinity and the two philosophies, but divinity, humanity, and Greek. Incessant industry in these pursuits was inculcated by the founder, and the fellows were even forbidden to accept the proctorship, lest the avocations of that office should interfere with their proper duties. The object and the stringency of these regulations called forth the celebrated encomium of Erasmus, that what Colossus was to Rhodes, what the Mausoleum was to Caria, that C. C. College would be to the kingdom of Great Britain. This prediction has hardly been fulfilled. The rules of the founder have been gradually set aside by acts of parliament, by custom, and by injunctions of the visitor. Of the three university lectureships contemplated by the founder, one was never founded at all, and the other two were merged in the college fellowships and tutorships. And, lastly, the college has suffered greatly from the severe restrictions imposed by statute upon the elections to fellowships. In virtue of the powers conferred by 17 and 18 Vict. c. 81, important changes have been effected by the college working in harmony with the commissioners. Both fellows

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and scholars are now elected without any restrictions as to place of birth. The fellowships are still 20 in number, value rather more than £300 a year. The college is now one of considerable eminence. Two of the fellowships are permanently attached to the two professorships of Latin and Jurisprudence, the professors being admitted honorary fellows of Corpus, and each receiving from its revenues a sum of £600 a year. The scholarships are 24 in number, tenable for five years, and of the annual value of £80, with rooms rent free; besides seven exhibitions recently instituted to be competed for annually by the commoners of the college. There are 22 benefices in the gift of this college; and in the year 1878, there were about 240 names on the college books.

CORPUS CHRISTI FE'STIVAL, the most splendid festival of the Roman Catholic Church. It was instituted in 1264, in honor of the Consecrated Host, and with a view to its adoration, by Pope Urban IV., who appointed for its celebration the Thursday after the festival of the Trinity, and promised to all the penitent who took part in it, indulgence for a period of from forty to one hundred days. The festival is chiefly distinguished by magnificent processions. In France it is known as the *Fête Dieu*.

CORPUS DELI'CTI, a criminal law term used in Scotland to signify the body or substance of the charge. Before a conviction can take place, the fact libelled must be proved—e. g., before a man can be convicted of murder. it must be clearly made out that there was a murder; and it is this fact that is called the corpus delicti. See CRIMINAL LAW.

CO'RPUSCLES, Blood. See BLOOD.

CORRE'CTION, House of, a prison for the reformation of petty offenders. See PRISON REFORMATORY.

CORRECTION OF THE PRESS. This is one of the most important of the many operations that every piece of printed matter must undergo before it is put into the hands of the reading public; and in every considerable printing establishment, it forms a special department executed by one or more functionaries, technically called "Readers." The immediate object of a corrector of the press, or "reader," is to observe and mark every error and oversight of the compositor, with a view to make the printed sheet a perfect copy of the author's manuscript. This is on the supposition that the manuscript itself is quite correct, which is seldom the case; and therefore the duty of a good reader extends to seeing that there are no inconsistencies in orthography, punctuation, abbreviations, &c., and in many cases to the verification of quotations, dates, and proper names. The duty of securing consistency in spelling and punctuation is especially important in the case of works on which several writers are employed, such as newspapers and cyclopædias. The corrector has also to direct his attention to the numbering of the pages; to the arrangement of chapters, paragraphs, and notes; to running titles, &c. It is part of his business to observe the mechanical defects of the work—defective types, turned letters, inequalities of spacing between words, sentences, and lines, crooked lines, and to secure symmetry in verses, tables, mathematical operations, and such like. In almost all cases, two proofs are taken, and in difficult works, such as those in foreign languages, tables, &c., even more. Lastly follows the revision, in which little more is done than seeing that the compositor has made all the corrections marked on the last proof. It is usual for the writer or author to reserve the correction of the second proof for himself.

In printing regular volumes, one sheet is usually corrected at a time; but where extensive alterations, omissions, or additions are likely to be made by writer or editor, it is more convenient to take the proofs on long slips, before division into pages. The corrections to be made are marked on the margin; and for this purpose an established set of signs or short-hand is used, understood by all printers, and which it is often useful to know.

The thankless and monotonous business of a corrector or reader is more difficult than the uninitiated would believe. It requires extensive and varied knowledge, accurate acquaintance with the art of typography, and above all, a peculiar sharpness of eye, which, without losing the sense and connection of the whole, takes in at the same time each separate word and letter. After the invention of printing, the C. of the P. was executed by the publisher himself, or at least was entrusted to men

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of ability and learning, and often men of name. Robert Stephen (1526—1559), and Plantin (1555—1589) had recourse to publicity, hung out the successive sheets of their publications, and promised a reward to any one who would point out a typographical error. Some editions of particular works are held in high estimation from the care with which the press had been corrected. Among the most famous are those that issued from the press of Aldus Manutius in Venice, of which we may mention the works of Petrarch (1514), corrected by Pietro Bembo; Aristotle (1551—1553, 6 vols.), corrected by the famous Greek scholar J. B. Camotius; Lactantius (1515), and Suetonius (1516), corrected by J. B. Egnatius; Plato (1513), Athenæus (1514), and Gregory Nazianzene (1516), corrected by Marcus Massurus. The first edition of Homer was printed by Nerlius in Florence (1484, 2 vols.), corrected by Demetr Chalkondylas. Robert Stephen of Paris himself corrected the numerous works that issued from his press: and Erasmus had a great name as a corrector.

CORRE'GGIO, a town of Northern Italy, province of Reggio nell' Emilia, midway on the railway between Parma and Modena; pop, 2700. It is very handsome, regularly built, and has a castle, a cathedral, and a theatre. It was a barony of the lords of Correggio, who were great patrons of letters. It is the birthplace of the painter Antonio Allegri, surnamed Correggio; and of the engraver Jesi, &c.

CORRE'GGIO, Antonio Allegri, a celebrated Italian painter, called C. from the place of his birth, a small town near Modena, now called Reggio. He was born in the year 1493—1494, and his father, a tradesman of some property, had him carefully educated, and instructed in the rudiments of art, by an uncle Lorenzo Allegri, a painter of small merit. How much he owed to his teacher is uncertain. He was the first among the moderns who displayed that grace and general beauty and softness of effect, the combined excellences of design and color with taste and expression, for which he is still unrivalled. His chiaroscuro is perfect. Almost before he had seen the great masters, he became a master in a style all his own; and was the founder, or rather his imitators for him, of what is called by some the Lombard, by others the Parma school of painting. On first beholding, at Bologna, Raphael's glorious picture of St Cecilia, he is said to have exclaimed: "Anch' io sono pittore" (I, too, am a painter). But this story is doubted.

There was long a tradition that C. lived in indigence, unaided but by his own genius; and it is remarkable that Vasari, who lived at the same time, in his "Lives of the Painters," records only vague rumors regarding C.'s life; and that Annibale Caracci, fifty years after his death, writes: "I rage and weep to think of the fate of this poor Antonio: so great a man—if, indeed, he were not rather an angel in the flesh." This belief, so prevalent in his own day, now refuted by recent researches, proves how retired and simple must have been his life. That he was in high estimation in his later days, is proved by his signature being found affixed to the deed of marriage of the Lord of Correggio, celebrated in 1588. C. died the following year, March 5, 1534, in his 41st year, and is buried in the Franciscan convent of Correggio.

At the age of 18, C. painted an altar-piece, the "Madonna di San Francesco," now in the Dresden Gallery, which is rich in pictures by C.; the most famous of which are the "Notte" (Night), lighted only by the celestial splendor beaming from the head of the infant Savior—Vasari calls it "quite wonderful"—and the famous "Magdalen" one of the most admired pictures in the world. For the cupola of the church San Giovanni at Parma, he painted an "Ascension" in fresco, and over the high-altar a "Coronation of the Virgin," now only known through copies and engravings. He also decorated elaborately in fresco the cathedral there, for which he received 1000 ducats; worth about £8500. In the Louvre are two pictures—the "Marriage of St Catharine," and the "Antiope;" in the Florence Gallery, three—one the "Madonna on her knees adoring the Infant;" in the Naples Gallery, three—one a lovely Madonna, called, from its oriental character, "La Zingarella" (the Gipsy), said to be a likeness of C.'s wife; at Vienna, two; at Berlin, three; at Parma, five—the most celebrated is the "St Jerome;" and in the British National Gallery, a Madonna, known as the "Vierge au Panier," the "Education of Cupid," and the famous "Ecce Homo," purchased by the British government for £11,500.

CORRE'GIDOR is the name given in Spain to the principal magistrate of a town. He is appointed by the king. The C. is also a Portuguese functionary, but, unlike

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his Spanish brother, does not possess the double power of governing and administering justice, but only the latter.

CORRELATION OF PHYSICAL FORCES. See FORCE.

CORRÈZE, a department of France, formed out of part of the old province of Limousin, and taking its name from an affluent of the Vezère—the Corrèze, which traverses the department from north-east to south-west. C. extends between lat. 44° 55′ and 45° 40′ n., and long. 1° 13′ and 2° 22′ e.; its total area is nearly 2890 square miles, and its population, in 1872, 304,746. The chief rivers of C. are the Dordogne, the Vezère, and the Corrèze. The surface of the department is mountainous, especially in the north and east, where it is broken in upon by offsets from the Auvergne mountains, which, in some parts, attain a height of 4000 feet above the sea. The lower slopes are clad with forests, but the district is in general sterile. In the south and south-west, however, the soil yields wheat, oats, barley, rye, maize, &c. Wine is also produced, but of poor quality. The rural population are poor, badly housed and fed; their food consisting, to a great extent, of chestnuts, which are very abundant. Minerals, particularly coal, iron, lead, alabaster, and granite of various colors, are found in considerable quantities. The department is divided into the three arrondissements of Tulle, Brive, and Ussel. Tulle is the chief town.

CORRIB, Lough, a lake, the third in size in Ireland, in the north of Galway. It is of very irregular shape, 27 miles long from n.w to s.e., and 1 to 6 broad, with an area of 68 square miles. It is between 28 and 31 feet above the sea-level. From its south end, 4 miles north of Galway, it discharges its surplus waters by Galway River into Galway Bay. It receives the waters of Lough Mask, at its north end, through the Pigeon Hole and other caves, as well as those of the Clare and other smaller rivers. On its sides are metamorphic rocks, carboniferous limestone, and marble. Near it are many monumental heaps and so-called Druid circles. It contains many islets, and to the west are mountains 2000 feet high.

CORRIDOR is a gallery or passage running (It. *correre*, Sp. *correr*, to run) or leading to several rooms, each of which has a door opening into it. Spacious corridors are necessary in all public buildings, such as hospitals, prisons, &c.

CORRIENTES (in English, *currents*) is a name of various application in Spanish America. Besides indicating several capes in Cuba, Mexico, and New Granada, it is more conspicuously connected with one of the States of the Argentine Confederation and with the capital of the same. 1. C., the city, stands in lat. 27° 27′ s., and long. 58° 46′ w., near the confluence of the Parana and the Paraguay. It takes its name from the rapids, which are said to be as decidedly a turning-point in the climate of the country as in the navigation of the river. Pop. 11,000. 2. C., the province, lies between Entre Rios on the south, and the republic of Paraguay on the north, having the Parana on the north and west. Lat. 27°—30° s., and long. 57°—59° w. Area about 60,000 sq. miles; pop. (1869) 129,023. The north is undulating and fertile; and the south, besides being generally swampy, is partly covered by Lake Thara. The products are maize, cotton, sugar, indigo, tobacco, and a species of silk.

CORRIEVRE'KIN, or Corrybre'chtan, or Gulf of Brechan, a whirlpool or dangerous passage a mile broad, off the west coast of Argyleshire, in the strait between Scarba and Jura isles. It is occasioned by the meeting of tides (often running 12 or 14 miles an hour) from the north and west, in the narrow passage into the Sound of Jura, round a pyramidal rock, which rises with rapid slope from a considerable depth to some fathoms from the surface. This rock forces the water in various directions. In stormy weather, at flow tide, vast openings form in the water, immense bodies of water tumble headlong as over a precipice, then rebounding from the abyss, dash together and rise in spray to a great height. The noise is heard over the isles around. The water is smooth for half an hour in slack water.

CORROSIVE SUBLIMATE, the popular name of Bichloride of Mercury (q. v.).

CORRUGATED IRON (Lat. *ruga*, a wrinkle). Common sheet-iron, and what is improperly called "galvanised iron" (i. e., sheet-iron coated with zinc by im-

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mersion in a bath of the fused metal), have of late been made available for many useful purposes, by virtue of the great additional strength imparted to the sheets by corrugation, which is merely an application to metallic substances of the old contrivance of "goffering or crimping," by means of which the frills of the olden time were made to keep their shape.

The sheets of metal are passed between rollers, the surfaces of which are formed into rounded grooves and ridges, the ridges of one roller filling the grooves of the other. The metal in passing between these is compressed into a waving form, or corrugated. It will be easily understood that a piece of sheet-metal, of given size and thickness, if rolled up to form a tube, will resist a much greater bending strain than when flat. Now the curves of the corrugation may be regarded as a series of half-tubes, and the additional strength is due to the application of the same principle. See STRENGTH OF MATERIALS. Walls and roofs of temporary buildings are now extensively made of this material. Railway sheds, emigrants' houses, temporary churches, store-rooms, and sheds for dockyards, &c., are among the common applications. Mr Francis, of New York, has applied the principle to the construction of light boats, the strength of which, and their power of resisting violent blows, such as boats are subject to on landing through a surge, is said to be remarkably great. On this account, they are proposed to be used for life-boats, ships' boats, &c. They are made by stamping the metal in enormous dies, of the shape and size of the boat, and grooved for the required corrugations. Small boats thus constructed require no internal bracings, the requisite rigidity and strength being given entirely by the corrugations.

CORRU'PT PE'RJURY. See PERJURY.

CORRUPT PRACTICES ACT. The laws relating to bribery, treating, and undue influence at elections of members of parliament, were consolidated and amended by 17 and 18 Vict c. 102 (10th August 1854), which was continued and amended by 21 and 22 Vict. c. 87 (2d August 1858). Both of these statutes were further continued till 10th August 1860, by 22 and 23 Vict. c. 48 (13th August 1859); and till 10th August 1861, by 23 and 24 Vict. c. 99.

Additional legislation on this very troublesome subject has been attempted in almost every session of parliament. See PARLIAMENT.

CORRU'PTION OF BLOOD. See TREASON.

CORRUPTION OF JUDGES. See JUDGE.

CO'RSAC (*Canis* or *Cynalopex Corsac*), an animal of the dog family (*Canidæ*), found in the deserts of Tartary and in India. In size, it resembles a small fox, but is more slender in body and limbs; it has long and pointed ears, a bushy tail, and is of a reddish or yellowish color; the form of the head resembles that of the fox. It lives in large communities, burrows, prowls during the day, and not during the night like foxes, and is believed to feed chiefly on birds and their eggs, but not to object even to insect food. There are several Asiatic species closely allied to this.

CO'RSAIR (Ital. *corso*, a race), a pirate or sea-robber, but generally limited in its application to the pirates who in former times sailed from Algiers, Tunis, Tripoli, and the ports of Marocco, and were the terror of merchantmen in the Mediterranean and the neighboring parts of the Atlantic Ocean.

CO'RSICA, an island in the Mediterranean, separated from the island of Sardinia by the strait of Bonifacio on the south, and situated in lat. 41° 20'—43° n., and long. 8° 30'—9° 30' e. It forms the French department of Corse, and has an area of 3340 square miles, with a population, in 1872, of 258,507. The greater portion of the island is occupied by ranges of rugged mountains, the highest being Monte Rotondo (ancient *Mons Aureus*), 9063 feet high, and covered with perpetual snow. There are several rivers in the island, the largest of which, having their source in Monte Rotondo, are the Tavignano (ancient *Rhotanus*) and the Golo (ancient *Tavola*). They flow into the sea on the east coast; the Golo is navigable for boats. Several small rivers, most of which are dry in summer, flow westward into the sea. The soil is generally fertile in the valleys, yielding all kinds of cereals, and much wine is produced. Olive, orange, fig, almond, and other fruit-trees flourish; fruit forming a considerable item in the exports. But C. is chiefly celebrated

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on account of its magnificent forests of oak, pine, chestnut, beech, larch, cork, &c. Many of the pines are upward of 120 feet high, and are much used for masts in the French navy. The chestnut forests are particularly fine, and the fruit serves as an important article of food for the inhabitants. Prickly-pear, arbutus, myrtle, &c., abound. Iron, lead, black manganese, antimony, marble, and granite of beautiful quality are found on the island, but these sources of wealth are not developed. Sheep of a peculiar black breed, with four and occasionally six horns, goats, and pigs are numerous, and the rearing of cattle is carried on to a great extent. Tunny, pilchard, and anchovy abound along the coast. C. is divided into the five arrondissements of Ajaccio, Bastia, Calvi, Corte, and Sartene. Ajaccio is the capital. The language spoken in C. is a corrupt Italian. The Corsicans are great *improvisatori*; valor, love of freedom, and desire of revenge are their principal characteristics.

In early times C. was known as *Cyrnos*, although its native name is said by some historians to have been the same as that it now bears. As early as 564 B.C., a colony of Phocæans had founded a city on its east coast. After successive changes of Carthaginian, Roman, Vandal, Greek, and Gothic rulers, it came in the 8th c. into the hands of the Saracens, who held it until the beginning of the 11th c., when it fell under the dominion of Pisa. It afterwards passed to the Genoese, who held it until 1755, when the Corsicans under General Paoli made themselves in great part independent. The French, to whom the Genoese surrendered the claims they themselves could not maintain, captured it in 1768; since which time, with slight intermission, it has remained in the possession of France.

CO'RSLET was the body-covering of pikemen. The C. was made chiefly of leather, and was pistol-proof.

CO'RSNED, or morsel of execration, was a piece of cheese or bread made use of in early times with a view to ascertain whether persons suspected of any crime were guilty or innocent. The C., according to Blackstone, "was consecrated with a form of exorcism, desiring of the Almighty that it might cause convulsions and paleness, and find no passage, if the man was really guilty, but might turn to health and nourishment, if he was innocent." In this mode of divination, barley-bread appears to have had the preference. It was one of the many forms of ordeal (q. v.).

CO'RSO (literally, course or running) is an Italian word used to express not only the racing of horses (without riders), but also the slow driving in procession of handsome equipages through the principal streets of a town, such as almost always takes place in Italy on festivals. This custom has given a name to many streets in almost all the larger towns of Italy. The best known of these is the C. in Rome, which is the scene of the celebrated diversions of the Carnival.

CORT, Cornelis, a famous Dutch engraver, was born at Hoorn in 1536. In 1572 he went to Venice, and was hospitably received there by Titian. Being less of a painter than an engraver, he seems very soon to have been employed by the great Venetian colorist for the reproduction in copper-plate of some of his masterpieces; and it appears he did it so well, that he afterwards engraved for Tintoretto and other Venetian masters. C. next settled at Rome, where he erected an engraving school, and had among his pupils Agostino Caracci, and from this school sprang the most excellent Italian and Venetian engravers. C.'s works had a favorable influence on the graver's art in the Netherlands. He died at Rome in 1578. His engravings, considering his short life of 42 years, are very numerous, amounting to more than 150.

CO'RTES is the name given in Spain and Portugal to the assembly of representatives of the nation. As one district of Spain after another was recovered by the Christian princes from the Moors, there arose in each a corporation composed of the different "States" or orders of the population, limiting the power of the princes. From the union of several of these territories were formed the two leading kingdoms of Castile and Aragon, having each its C., representing the clergy, the nobility, and the cities. In Aragon, the C. appointed a judge, *el justicia*, who decided disputes between the king and his subjects, and confined the royal power within constitutional limits. In Castile the rights of the burghers were less extensive than

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in Aragon, but in both states the king was dependent on the Cortes. After the union of Castile and Aragon under Ferdinand and Isabella, the crown succeeded in making itself less dependent on the C., whose power and privileges were gradually encroached upon, until at last they were seldom assembled except to do homage or to sanction an arrangement as to the succession to the throne. After 1713 they did not meet till 1789, on the accession of Charles IV. In 1809, the C., as composed in 1789, was assembled by the Junta, and framed a new constitution, called the Constitution of 1812, which, however, was set aside at the restoration. Endless attempts at restoration and modification of the Spanish C. have since been made, without any happy result. See SPAIN.

The history of the Portuguese C. is very similar to that of the Spanish. In 1826, Dom Pedro promulgated a new constitution after the model of the French, calling the C. again into life, and abdicating at the same time in favor of his daughter, Maria da Gloria. This constitution was set aside during the usurpation of Dom Miguel, but was finally restored in 1842.

CO'RTÉS, Hernan, the daring conqueror of Mexico, was born in 1485, at Medellin, a village of Estremadura, Spain. He was educated for the law, but afterwards adopted the profession of arms; and in 1511 distinguished himself under Diego Valasquez in the expedition against Cuba. In 1518 the conquest of Mexico was intrusted to him by Valasquez, who was then governor of Cuba; but the latter had no sooner granted him the commission than he wished to revoke it, fearful that his dashing and sagacious lieutenant would deprive him of all the glory of the enterprise. C., however, maintained his command in defiance of the governor. Never, perhaps, was an enterprise so great undertaken with so little regard for its difficulties and dangers. A force of between 600 and 700 men, only thirteen of whom were musketeers, with only ten field-pieces and two or three smaller pieces of cannon, were all the means at C.'s disposal to effect the conquest of the then extensive empire of Mexico, when, early in 1519, he landed on its shores. Sailing up the river Tabasco, C. captured the own of that name, the prowess of the Spaniards occasioning great terror to the Tabascans, who made liberal presents to the white men, and volunteered all the information about Mexico in their power. Arriving off the coast of San Juan De Ulloa, C. was here visited by some Mexican chiefs, with whom he entered into negotiations regarding a visit to Montezuma, who then ruled with nearly absolute sway over Mexico. Montezuma sent C. rich presents, but objected to his visiting the capital. But C. had resolved upon seeing the emperor in his palace, and was not to daunted by opposition. Having founded the town of Vera Cruz, and burnt his ships, so that his troops could not return, and must therefore conquer or perish, C., with a force reduced to 400 Spaniards on foot and 15 horse, but with a considerable number of Indian followers, lent him by dissatisfied chiefs dependent on Montezuma, marched upon the capital. Overcoming the Tlascalans, a brave people, on the way, who after became his firm allies, and taking fearful vengeance on the city of Cholula, where, by Montezuma's orders, a treacherous attempt was made to massacre his troops, C. on the 8th November 1519 reached the city of Mexico with his little band, and was received with great pomp by the emperor in person. The Spaniards were regarded as those descendants of the sun who, according to a current prophecy, were to come from the east and subvert the Aztec empire—a tradition that was worth a good many soldiers to Cortes. An attack on C.'s colony at Vera Cruz by one of Montezuma's generals, however, proved the mortality of the Spaniards, and would have been the ruin of them but for the decisiveness of C., who immediately seized the emperor, and carrying him to the Spanish quarter, forced him to surrender the offending general and three other chiefs, whom he caused to be burnt in front of the palace, and ere long compelled him formally to cede his empire to Spain. One has nothing but astonishment for this man, whose daring acts in the capital city of the empire, containing, it is calculated, 300,000 inhabitants, had nothing but 400 Spaniards, and a few thousand Indians, whom he had recently conquered, to support them. Meanwhile Valasquez, enraged at C.'s success, sent an army of about 1000 men, well provided with artillery, to compel his surrender. C. unexpectedly met and overpowered this force, and secured its allegiance. But in his absence the Mexicans had risen in the capital, and C. was finally driven out with much loss. During the disturbance, Montezuma, who was still kept a prisoner, appeared on a

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terrace with a view of pacifying his people; but he was wounded by a stone, an indignity against his kingly person which he took so much to heart that he died in a few days. C. now retired to Tlascala, to recruit his fatigued and wounded men; and receiving reinforcements, he speedily subjugated all Anahuac to the east of the Mexican valley, and soon marched again on the city of Mexico, which he succeeded in capturing (August 16, 1521) after a siege of four months, ended by a murderous assault of two days. Famine had assisted the Spanish arms, so that of the vast population only about 40,000 remained when the Spaniards entered the city, which lay in ruins, "like some huge churchyard with the corpses disinterred and the tombstones scattered about." Mexico was now completely subjugated, for though some attempts at revolt were afterwards made, they were soon crushed by C., who had been nominated governor and captain-general of the country by Charles V. In 1528, C. returned to Spain, to meet some calumnies against him, and was received with great distinction. On his return to Mexico in 1530, however, he was divested of his civil rank. At his own expense he fitted out several expeditions, one of which discovered California. In 1540 he came again to Spain, but was coldly received at court, from which he soon retired, and died at Seville, December 1547.

CORTO'NA, a town of Central Italy, about 56 miles south-east of Florence. It is beautifully situated amid vineyards on a hill rising from the fertile valley of the Chiana, and commanding a view of the lake of Perugia (anc. *lacus Trasimenus*). The city is of fabulous antiquity, older, it is said, than Troy; and the Cyclopean walls, erected by the Pelasgians—which in many parts remain unchanged—prove, if not a history quite as old as tradition affirms, at all events one second in remoteness to few places in Italy. It was one of the most powerful of the twelve cities forming the Etruscan League. By the Romans, who settled a colony here about the time of Sulla, it was called *Corythus*. After many vicissitudes during the middle ages, the town became subject to Florence in the 15th century. Besides the walls, there are several objects of Etruscan antiquity at Cortona. The modern town contains above 3900 inhabitants. Among the principal buildings are the cathedral, dating from the 10th or 11th c., with some fine paintings and monuments, the churches of Jesus, St Francesco, and others. The Etruscan Academy has its seat here, the museum connected with which contains a multitude of Etruscan sarcophagi, vases, &c. C. has a trade in wine and olives, and fine marble is found in the vicinity.

CORU'NA (English, *Corunna*), a fortified seaport of Spain, situated on a small headland in the Atlantic, formed by the three bays of Betanzos, Cornña, and El Ferrol, about midway between Capes Finisterre and Ortegal, in lat. 43° 22' n., long. 8° 22' w. C., which is a thriving place, is built partly on the slope and partly at the foot of a hill, and is divided into the upper and lower towns, the former being the most ancient. The lower town, which was formerly inhabited chiefly by fishermen, is now more important than the upper. It is well built, chiefly of granite, and some of its streets are broad and well paved. There are few public buildings of any note in Cornña. A citadel defends the town, and the harbor, protected by forts, is safe and commodious. In 1871, 856 vessels, with an aggregate tonnage of 34,997 tons, entered, and the same number and tonnage cleared the port. During the same year, the value of cargoes amounted to £119,260. Pop. 23,500. C. dates its origin from the Phœnicians, from whom it was taken by the Romans in the 1st c. B.C. or Englishmen, great historical interest attaches to Corunña. Here, in 1386, John of Gaunt landed to claim the crown of Castile in right of his wife, daughter of Pedro the Cruel; in 1554, Philip II. embarked here for England to marry Queen Mary; and in 1589 the great Spanish Armada, which had been refitted at this port, set sail for the conquest of England. But C. is best known in connection with the death of Sir John Moore, who, as a fitting conclusion to his memorable retreat, with about 14,000 men defeated (January 16, 1809) on the heights of Elvina, behind C., 20,000 French under Soult. Moore, who was mortally wounded in the action, was buried on the ramparts in his military cloak. A monument erected by the British government, marks the place of his burial.

CORU'NDUM, a mineral consisting essentially of mere alumina, yet of great specific gravity—about four times that of water—and of remarkable hardness, being inferior in this respect only to the diamond. Mineralogists regard the sapphire as a variety of C., and along with it the gems popularly known as Oriental Ruby,

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Oriental Topaz, Oriental Emerald, and Oriental Amethyst; but the name C. is more usually limited to the coarser varieties, to which it is applied by the natives of India. These, instead of exhibiting the brilliancy of gems, are in general of a dull and muddy appearance, and the crystals—which are usually six-sided prisms, and six-sided pyramids—are externally dull and rough. The color is various, often green, blue, or red, inclining to gray. The variety called *Adamantine Spar* is of a hair-brown color and adamantine lustre. Some corundums—known as *Asteria Sapphires* or *Star Sapphires*—when cut in a particular manner, exhibit an opalescent star of six rays. C. is found in many parts of the world, and has long been used in India for polishing all gems except the diamond, which is too hard for it, and also for polishing the stones used in temples and other buildings. Emery (q. v.), so well known as a polishing substance, is a variety of corundum.

CORVEI (*Corbeia nova*), a Benedictine abbey on the Weser, near Höxter, the oldest and most famous in early Saxony, founded in the beginning of the 9th century. It was a colony from the monastery of the same name in Picardy, then part of the country of the West Franks. It received rich endowments; was the centre of great agricultural improvement and prosperity during the earlier part of the middle ages; and the seat of a school, founded by Ansgar, the Apostle of the North, which flourished greatly in the 9th and 10th centuries, and was next in reputation to Fulda. Its abbots were numbered amongst the spiritual princes of the German empire. In 1794 it was made a bishopric by Pius VI. Its territory then extended to about 23 square miles, with 10,000 inhabitants. In 1803 it was annexed to Nassau, from which it was transferred in 1807 to Westphalia, and in 1815 to Prussia. In 1822 the lands belonging to the ancient abbey passed into the hands of Count Victor Amadeus von Hessen-Rheinfels-Rothenburg, which were formed into a mediate principality of the Germanic empire. The church of the abbey is built in the Gothic style, very magnificently adorned in the interior, and contains a multitude of monuments of successive dynasties. The library and archives of the cloister, which contained most valuable records of the early ages of German history, have all been destroyed—the authenticity of the "Chronicon Corbejense," an alleged record of this abbey from its foundation to the end of the 12th c., being doubtful.

CORVETTE, is a flush-decked vessel, ship-rigged, but without a quarter-deck, and having only one tier of guns.

CO'RVIDÆ, a family of birds of the order *Insessores*, tribe *Conirostres*, having a strong bill, compressed towards the point, and covered at the base with stiff, bristly feathers, which advance so far as to conceal the nostrils. The plumage is dense, soft and lustrous, very generally dark, but sometimes of gay colors, more particularly in the tropical species. The birds of this family are widely diffused over the world. They are generally birds of strong and rapid flight; some of them are solitary, some gregarious in their habits; some reside in woods, some in moors and wastes, some on seacoasts, &c. They are very omnivorous. They are also remarkable for their intelligence, their prying curiosity, and their disposition to pilfer and secrete glittering articles. Besides the crows, raven, rook, and jackdaw, which belong to the genus *Corvus*, the magpie, jay, chough, and nut-cracker are included among the C. of Britain.

CO'RVO, the most northerly of the Azores, is the smallest among the inhabited islands of the group. It measures only 6 miles by 3, the latitude of its southern point being 39° 42′ n. It is of volcanic origin, and has, in an exhausted crater, a small lake 1277 feet above the sea. With a fertile soil and a delicious climate, C. contains barely 1000 inhabitants, and these generally poor.

CO'RWEN, a town in north Wales, in the northeast of Merionethshire, situated on the right bank of the Dee, 10 miles west of Llangollen. It is sheltered by a rock at the foot of the Berwyn mountains. Pop. of parish (1871), 2464. Here the Welsh under Owen Gwynedd defeated Henry II., and afterwards under Owen Glyndŵr defeated Henry IV.

CORYDA'LIS. See FUMARIACEÆ.

CORYGAU'M, an insignificant village in the presidency of Bombay, is historically interesting in connection with the final subjugation of the Peishwa of the Mahrattas. On 1st January, 1818, it was defended for nine hours by a mere hand-

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ful of men under Captain Staunton against a native force numbering at least 3000 infantry and about 20,000 cavalry, the struggle terminating in the repulse of the assailants after terrible slaughter. C. stands 16 miles to the northeast of Poona, in lat. 18° 39′ n., and long. 74° 8′ e.

CORYLA'CEÆ. See CUPULIFERÆ.

CO'RYLUS. See HAZEL.

CO'RYMB, in Botany, a form of *indefinite* and *centripetal* inflorescence, in which the flowers are arranged as in a raceme (q. v.), but the lower flower-stalks are elongated so as to bring the flowers almost to the level of those of the upper. The C. is a very common form of inflorescence.

CORYMBI'FERÆ. See COMPOSITÆ.

CORY'MBUS (Gr. *korumbos*), the particular mode of dressing the hair among the Greeks, with which the statues of Venus have rendered us familiar. The hair was often covered with a sort of open ornamental work.

CO'RYPHA, See FAN PALM, GEBANG PALM, and TALIPAT PALM.

CORYPHÆ'US (from Gr. *koruphe*, a summit), the leader of the chorus in ancient Greece. The name is now used to signify those of the highest distinction in any art or science. In the Italian Opera the choir-leader is called the *corifèo*; in French, *coryphée*.

CO'RYPHENE (*Coryphæna*), a genus of fishes of the family *Scomberidæ*, to which the name DOLPHIN, properly belonging to a genus of *Cetacea*, has by some mistake been popularly transferred. The coryphenes are remarkable for the beauty and metallic brilliancy of their colors, which delight the spectator as they are seen gliding with extreme rapidity near the surface of the water, gleaming in the light of the sun; and the changes of which, as they lie dying on the shore or on the deck of a vessel, have acquired a peculiar poetic celebrity. They have an elongated compressed body, covered with small scales, the head rising in a sharp crest, the mouth large. They are natives of the seas of warm climates, and some species are found in the Mediterranean, among which is *C. hippuris*, the largest known, attaining a length of five feet. This and some of the other species are often seen playing around ships; and great interest is occasionally awakened by their pursuit of shoals of flying-fish. In this chase, a C. may be seen to dart completely out of the water, making a leap of ten yards or more. Captain Basil Hall likens the velocity to that of a cannon-ball. The C. is often caught by sailors, with a glittering bit of metal instead of a bait.

COS (more anciently, Meropis), an island of the Grecian Archipelago belonging to Asiatic Turkey. Its modern name is Stanko or Stanchio. C. has a length of 28 miles, with a breadth of 5, and a population of from 20,000 to 30,000, the half of whom are Greeks: the other half being Turks and Jews, who congregate in the towns. On the eastern side of the island a range of hills extends along the coast, from Cape Fonka on the north, to Point Korkillo on the south; but with this exception, C. consists mostly of delightful and fertile plains, which are well cultivated. South of these plains, on which stands the principal town, of the same name as the island, rises a high mountain range, which, from its jagged summit, is called Mount Prion—the "sawing" mount, or sierra. There are many mineral springs on the island. The exports consist principally of raisins, lemons, salt, and grain. They amount annually to about £50,000. The chief imports are oil, soap, butter, butcher-meat, and English manufactures. The climate in general is pretty healthy. Many ancient Greek remains are scattered over the island. The chief town, Comopolis or Cos, is situated on the north-east coast. It is built on the ruins of the ancient city of the same name; and in the centre of the chief street is a gigantic palm-tree, said to have stood there before the Christian era. To the north-west is an old fortress of the knights of St. John. The harbor is small, with only about 6 feet of water in it. The inhabitants are employed chiefly in agriculture. Modern Greek is the language spoken. In early times, C. was sacred to the worship of Æsculapius. It was the birthplace of Ptolemy Philadelphus, of the painter Apelles, and the physician Hippocrates.

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COSCINO'MANCY, a species of divination practised from the earliest times by means of a sieve (Gr. *koskinon*) and a pair of shears or forceps. It appears to have been chiefly employed for the discovery of thieves. The sieve was supported or suspended by means of the shears, in some way not easily understood; a certain mystical form of words was then used, and the names of the suspected persons being mentioned in succession, at the name of the thief the sieve moved or turned round.

COSE'NZA, a town of Italy, capital of the province of the same name, about lat. 39° 20' n., long. 16° 15' e. It is situated 12 miles east of the Mediterranean, in a mountain-enclosed valley at the confluence of the Crati and the Busento, the waters dividing the town into two parts. The lower town is much affected by malaria arising from the river marshes, but the upper town is tolerably healthy. It is the residence of the principal families, and contains some handsome buildings, including a cathedral, and an unusually fine court-house. The streets generally are narrow and crooked. C. has considerable industry, the principal articles of manufacture being silk, earthen-ware, and cutlery. Pop. about 15,000. Anciently, C., called *Consentia*, was a city of the Brutii. It was captured by the Carthaginian general Himilco, and was forced to surrender (204 B. C.) to the Romans, who afterwards colonised it. Alaric the Goth died here 410 A. D., and is buried in the bed of the Busento. Area of province (formerly called Calabria Citra), 3000 sq. m.; pop. (1871) 440,468.

CO-SINE, Co-tangent, &c. See TRIGONOMETRY.

CO'SMAS, surnamed *Indicopleustes*, a merchant of Alexandria, who lived in the middle of the 6th c., and after having travelled much, returned to Egypt, where he spent the evening of his days in monastic retirement, and wrote a "Christian Topography" in 12 vols., in the Greek language, containing much information about many countries, and particularly about India. An attempt to reconcile everything to his notions of the meaning of the Bible has led him into many errors. The work (which, among other things, gives the first account of the *Monumentum Adulitanum*, see ADULE) has been edited by Montfaucon in the "Nova Collectio Patrum Græcorum," vol. ii. (Par. 1707). C. wrote also a description of the plants and animals of India, which was published by Thevenot in his "Relations de Divers Voyages Curieux," vol i. (Par. 1666).

COSMETICS (Gr. *kosmeo*, I adorn) are chemical preparations employed for improving the appearance of the skin and hair. Several of the C. in use are comparatively harmless, such as perfumed starch and chalk; whilst others, such as *pearl white* (the subnitrate of bismuth), are more or less poisonous, and dangerous to use. At all times, the employment of C. is not to be commended, as the minute particles tend to fill up and clog the pores of the skin, and prevent the free passage of gases and vapors, which is so essential to the preservation of any animal organ in a thorough state of health.

COSMO DE' MEDICI. See MEDICI.

COSMO'GONY (Gr. *kosmos*, the universe; *goné*, generation) is the (so-called) science of the formation of the universe. It is thus distinguished from cosmography, which is the science of the parts of the universe as we behold it (a science embodied in the work of Humboldt, entitled "Cosmos"), and from Cosmology, which reasons on the actual and permanent state of the world as it is. Geogony, which confines itself to the formation of the earth, and speculative geology, are but subdivisions of cosmogony.

Cosmogonists proper may be divided into two classes—the Theistical, and the Pantheistical. According to Theistic C., the world of matter and order sprang at once into existence at the Omnific fiat. The chief speculations from this point of view, have of late been regarding the *date*, if the expression may be used, of the world's formation, and, looking to the facts of geology and astronomy, the precise condition of the cosmos when evoked; how much, in short, of the evolution, since the date, is attributable to the operation of secondary causes. The Pantheists hold the universe, on the other hand, to be the very body and being of Deity, and as such to have been from all eternity. God is all things, and all things are God—a conclusion reached from pure *à priori* reasoning, and that seems to exclude all further inquiry.

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Men of science, in modern times, stopping short of an actual C. or genesis of the world, have pushed their inquiries into the order of development of its present state, which they, or at least some of them aver to have taken place from the first by the divine power exercised in the manner of natural law. They assume the existence of matter; and with them there is no proper beginning of things, but an eternal round, under fixed laws of growth and decay.

In cosmogonical speculations, heat, air, atoms with rotatory motions, numbers—all in turn have had the honor of being recognised as the fountain and causes of things. Latterly, there has been a tendency to dynamical hypotheses, not only of the formation of our own rotating globe, but of our system, and of all similar systems in space. Of these, the chief is that of Laplace, founded on observation of the mutual relations of the planets, their common direction in rotation and revolution, their general conformity to one plane, &c; taken in connection with such facts as the rings of Saturn and the fundamental unity of the asteroids. Thus arose the NEBULAR THEORY (q. v.), which at one time had the support from Sir William Herschel's observations on the *nebulæ*; of which, however, the discoveries by Lord Rosse's telescope in a great measure deprived it. Following up this view of a formation of the globes by natural causes, there have been speculations as to the commencement and progress of organic life upon them by similar means; these are to be found in the "Philosophie Zoologique" of Lamarck; the "Vestiges of the Natural History of Creation;" and in the work of Charles Darwin on the "Origin of Species by a Principle of Natural Selection;" all of which involve great differences of view among themselves though all meeting in one point—an assimilation of the processes of creation to the ordinary natural course of things presumed to be arranged and conducted by the Diety.

COSMORA'MA (Gr. *kosmos*, the world, and *orao*, to see), an exhibition of views from different parts of the world. See DIORAMA.

CO'SMOS. See COSMOGONY.

COSNE, a town of France, in the department of Nièvre, about 30 miles north-north-west of Nevers. It is situated on the right bank of the Loire, here crossed by a suspension-bridge, is generally well built, and has iron forges and manufactures of cutlery. Pop. (1872) 5024.

CO'SSACKS (Russ. *Kasacks*), a race, in appearance, manners, and language, very much resembling the Russians. The name Kasack is of Turkish or Tartar origin, signifying, in the Turkish language, a robber, in the Tartar, a light-armed warrior. The C. are not, however, akin to the Turks or Tartars, but are descendants of the ancient Russians of Novogorod and Kiew, to whom the necessity of maintaining a constant resistance to enemies has given a peculiar warlike character. There are two principal branches of the Cossack family—the Malo-Russian C. or C. of Little Russia, and the Don Cossacks. The former are the more wild and rude. To this branch belong the *Saporogi* C., who dwell beside the water-falls or *Porogi* of the Dnieper, and are the most unscrupulous robbers of all. The Don C. inhabit the great steppes to the north of the Sea of Azof and of Caucasia. Their country forms a Russian government by itself, of about 60,000 square miles in extent, and with a pop. (1867) of 1,010,135. The capital is Nowotoscherkask (q. v.). The C. belong to the Russian Greek Church. Their military chief, called the Ataman or Hetman, resides at Nowotscherkask. To the Don Cossack branch belong the *Tchernomorski* C., who inhabit the steppes of the Kuban—the C. of the Volga, who are scattered through the governments of Astrakhan and Saratow—the C. of the Terek, of the Ural, of Azof, and of Siberia. The whole number of the C. is reckoned about 1,900,000. They contribute much to the military strength of Russia: but several insurrections, of which the most alarming was that of 1773, have taken place since they became subject to the Russian government.

COSSIMBAZA'R, in English, *Cossim's market*, stands on the Bhagirathi, which is the first or most westerly offset of the Ganges, and unites with the Jellinghee to form the Hoogly. It is in lat. 24° 6 n., and long. 88° 18' e. being 120 miles by land to the north-east of Calcutta. It contains about 4000 inhabitants. C. was at one time famous for its silk-manufacture, which, however, has in a great measure, yielded to British competition. It is now worthy of notice chiefly as the river-port of Moor-

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shedabad, of which it is, in fact, a suburb. Such is its prominence in this respect, that it often gives its own name to the stream on which it is situated.

CO'SSUS. See GOAT MOTH.

COSTA, Isaac da, an eminent poet and religious writer, was born at Amsterdam, January 14, 1798. His parents were Portuguese Jews, who had settled in Holland. The first aspiration of his poetical genius having been shewn by his Hebrew teacher to Bilderdijk, the latter expressed himself favorably regarding it, and a warm and lasting friendship sprang up between him and Costa. In his twentieth year, C. acquired the degree of Dr at Law; and shortly after, having embraced Christianity, was baptised. This subjected him to considerable persecution, which, however, subsided as his genius gradually gained recognition. The most interesting of his writings to the British Public are probably his translation of Byron's "Cain," his "Israel and the Gentiles," and "Harmony of the Gospels," the last two of which have been translated into English. As a public lecturer, C. specially excelled. His "Battle of Nieuwpoort," the last of his poems, is one of his master-pieces. He died, April 28, 1860, and, though privately buried, was honored with a concourse unexampled, except when De Ruyter and Van Speyk were interred with public pomp in the same *Nieuwe Kerk* at Amsterdam.

COSTA, Sir Michael, a very popular musician and composer, was born at Naples, February 1810. As he early shewed a decided talent for music, he was sent to the Conservatoire in his native city for education, where he greatly distinguished himself. In 1828, his fame, though he was then but 18, having reached England, he was invited to take part in the Birmingham Musical Festival, an invitation he complied with; and he was so well received in this country that he resolved to settle in it. In 1830, he was appointed conductor of the music in the Italian Opera, London, an office which, in 1847, he resigned for a similar one in the Royal Italian Opera, Covent Garden. His great work, the oratorio "Eli," produced at the Birmingham Festival of 1855, raised him to a high rank as a composer. "Naaman," first sung in Birmingham in 1864, was a great success. He was knighted by Queen Victoria in 1869; and, in the same year, received the Royal order of Frederick from the king of Würtemberg, in token of his Majesty's admiration of "Eli," performed under the composer's direction at Stuttgart the previous November. C. is the author of several ballets, and of some operas, the most successful of which was "Don Carlos."

CO'STA RI'CA, the most south-easterly state of Central America. It occupies the entire breadth from sea to sea between Nicaragua on the one side and New Granada on the other, stretching in n. lat. from 8° to 10° 40', and in w. long. from 83° to 85°. With an area of 26,000 square miles, it is estimated to contain (1870) 165,000 inhabitants. The country is generally mountainous—more so on the north-east than on the south-west—with many volcanoes, the temperature becoming mild and salubrious in proportion to the elevation. It yields gold and silver, tobacco, sarsaparilla, indigo, sugar, cocoa, and dye-woods. The principal staples, however, of foreign trade are coffee, hides, and cedar. These are exported chiefly from Punta Arenas, on the Gulf of Nicoya, an inlet of the Pacific Ocean. The other places of any note are San José, the capital, and the cities of Cantago, Alajuela, Heredia, Estrella, and Esparsa. The government is republican, the president being elected every four years. A notorious filibuster, William Walker, put Costa Rica, some years ago, to much trouble commercially and politically. Estimated revenue in 1876-7, £476,000. In 1875, the imports amounted to £570,000, the exports to £851,866. The exports consist chiefly of coffee, of which upwards of 24,000,000 lbs. were exported in 1877. A railway from the Atlantic to the Pacific, by way of San José, is being constructed.

COSTE'LLO, Louisa Stuart, a voluminous English authoress, was born in 1815. Her first production, at least of any note, was "Specimens of the Early Poetry of France" (1835), but it was as a tourist she gained the greatest popularity. The works in which she describes her travelling-trips are—"A Summer amongst the Bocages and the Vines" (1840); "A Pilgrimage to Auvergne, &c." (1842); "Béarn and the Pyrenees" (1844); "The Falls, Lakes, and Mountains of North Wales" (1845); and "A Tour to and from Venice by the Vaudois and the Tyrol" (1846). Miss C.

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also wrote several novels, the principal of which are "The Queen-mother" (1841), and "Jacques Cœur, the French Argonaut" (1847). In 1853, she published a work of a professedly historical character, entitled "Memoirs of Mary, the Young Duchess of Burgundy;" and in 1855, another of the same kind, "Anne of Brittany." Miss C. wrote in a very pleasant and picturesque style. She died in 1870.

CO'STER, Laurens Janszoon, according to the Dutch, the inventor of printing, was born at Haarlem about the year 1370. The time of the invention ascribed to him must have fallen between the years 1420 and 1426. C., at first for his own amusement and the instruction of his grandchildren, cut letters out of the bark of the beech-tree, which he inverted, and employed to print short sentences. Afterwards, he discovered a more glutinous kind of ink, which did not spread in using, and succeeded in printing with it entire pages with cuts and characters. He also replaced his wooden types by types cast out of metal, at first using lead for this purpose, but afterwards pewter, which he found harder and more suitable. C., for a time, worked in secret, because, he being a sacristan, his art, if known, would have brought him into unpleasant collision with the manuscript-writing clergy, whose productions he tried to imitate, even to the abbreviations; thus his name did not appear on the productions of his press. As custom increased, C. had to take apprentices; and one of them, a German, Johann, making use of the confusion occasioned by C.'s death in 1439, is said to have purloined the greater part of his master's types and matrices, and to have fled to Mainz, where he brought the hidden art to light. This Johann was probably Johann Gänsfleisch, a member of the Gutenberg family. Such, at least, is the history of the invention of printing as given by the Dutch, and which they support by the testimony of Hadrianus Junius, the historian of the states of Holland, who, in his account of the discovery, states that, at the time he wrote, C.'s descendants were in possession of drinking-cups made out of the remains of the types which C. had used. Moreover, a celebrated printer of Cologne, Ulrich Zell, deceased about the year 1500, is said to have declared "that Gutenberg, *his master*, had derived his art from Holland, after the model of a 'Donatus' printed there." Now, a Donatus of C.'s time still exists; it was produced in 1740 by Johannes Enschedé, also a celebrated printer of Haarlem; and no sooner had his discovery been made known in Meerman's "Origines Typographicæ," than fragments of the same work appeared in such quantities, that no one could any more aver that this early monument of imperfect typography, mostly printed from indisputably Dutch types, had been struck off from Gutenberg's press. Gutenberg's works, even now, are models of impression; those ascribed to C., *at first printed on one side only*, are the first proofs of a beginner. Then, all the characters of the oldest Dutch printed books resemble the Dutch handwriting of the first half of the 15th c., a proof of the independent nature of the attempts towards imitating manuscripts for sale. Other evidences are given by the Dutch that C. was the true inventor of printing; the most eminent advocates of his claims being Meerman, Koning, Scheltema, Van Westreenen van Tiellandt, De Vries, Schinkel, Noordziek, Ebert, Leon de Laborde, Paul Lacroix, and Bernard. Yet the most thorough-going assault on the claims of C. and of Haarlem, as being founded on local legends, was made in 1870 by a Netherlander, A. von der Linde. In the town-house of Haarlem, the typographical remnants of the productions ascribed to C. are preserved. See PRINTING; and for the German account of the invention, GUTENBERG. As for C., his memory still is held in due honor by the town of his birth; the site of his house is still pointed out with pride; and monuments to his memory have been erected.

CO'STMARY (i. e., *cost*, or aromatic plant, of the Virgin Mary), or Ale-Cost *Balsamita vulgaris*), a perennial plant of the natural order *Compositæ*, sub-order *Corymbiferæ*, a native of the south of Europe, which has long been cultivated in gardens in Britain for the agreeable fragrance of the leaves. The root-leaves are ovate, of a grayish color, on long footstalks; the stem is 2—3 feet high; the stem-leaves have no footstalk; the small heads of flowers are in loose corymbs, deep yellow. The leaves were formerly put into ale and negus, and are still used by the French in salads.

COSTRO'MA. See KOSTROMA.

COSTS, the technical name in English law for the expenses incurred in legal

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proceedings. As a general rule, the C. of the successful party are paid by the loser, but the rule is subject to important exceptions. 1. A party suing or defending *in forma pauperis* (to entitle him to which privilege he must swear that he is not worth £5), does not pay C., though he is entitled to receive them if successful. 2. In actions in which the plaintiff recovers damages under 40s., he is, in certain cases, not entitled to C., unless the presiding judge certifies that he ought to have them; and in all other cases, he is not entitled to them, if the presiding judge certifies that he ought not to have them. 3. A plaintiff who might have brought his action in the county court, is not entitled to C. if he sues in the higher courts, and recovers not more than £5 in certain actions, or £20 in others, unless the judge who tries the case certifies that it was proper the action should have been brought in the higher court. 4. A party who is successful in the main, and therefore entitled to the "general costs," may be unsuccessful upon some minor point, and therefore bound to pay the C. which belong properly to it. 5. A party who has tendered the amount recovered, and who pays the sum into court, and pleads the tender, is not bound to pay costs. 6. The payment of money into court in the course of an action relieves the party paying from C. of subsequent proceedings, if no greater amount be ultimately recovered.

C. formerly used to be given neither to nor against the crown, either in its fiscal, public, or private capacity; but by 18 and 19 Vict. c. 90, and 23 and 24 Vict. c. 34, the crown is now entitled to C., and bound to pay C. in the same way as a private suitor.

C. are taxed (i. e., the items allowed or disallowed) by the officer of the court appointed for the purpose under the name of the master. When so ascertained, they are, if in favor of the plaintiff, included in the amount for which judgment is given, if it be in his favor, and recovered as part of it. If they are in favor of the defendant, they are recovered as a judgment in his favor; and any party may have, if he chooses, his own attorney's or solicitor's bill taxed by the same officer before paying it, or even after payment in certain cases.

In criminal cases, the prosecutor's C. may be allowed by the judge, and in that case are paid out of the county rates, the county being reimbursed by the Treasury.

In Chancery suits, C. are, in the discretion of the court, given as a general rule to the successful party; but when the suit was properly instituted, and was of the nature of an administrative suit, C. are often given out of the estate.

C., in Scotland, are called Expenses (q. v.). See also AUDITOR OF THE COURT OF SESSION.

COSTUME (Ital., *costume;* Fr. *coustume, coutume,* from Lat. *consuetudo,* use and wont) is another form of the word custom, and, in its wider sense, signifies the external appearance which the life of a people presents at a particular epoch of its history. In its narrower and more usual sense, C. signifies the customary modes of clothing and adorning the person, in any particular age or country. In this sense it includes the prevailing fashion in jewelry, weapons, and other personal equipments. In both senses, C. plays an important part in art. The poet, more especially the narrative or epic poet, is compelled to resort to it as a means of carrying his reader back into the age which he describes. Homer has it constantly in view in narrating the exploits of his heroes. Amongst modern romance writers, Sir Walter Scott has introduced the fashion of perhaps an excessive attention to mere external costume. But it is in art as presented to the eye, that C. becomes indispensable, and the loose and general treatment of it which is permitted to the novelist or the poet, is forbidden to the painter, the sculptor, and the player. How sorely the sculptor has been tried by the wigs and breeches of former generations, and by the trousers, straps, hats, and other monstrosities of our own, no one who has seen a statue of Frederick the Great, or of the late Sir Robert Peel, can require to be told. Two means, not of solving but of escaping from the difficulty, have been largely resorted to: the one consists in departing from the modern dress altogether, and reverting to the ancient toga; the other, in wrapping up the figure, as far as possible, in a cloak. The first of these devices is neither more nor less than a deliberate violation of what artists regard as the laws of C., by which they conceive themselves bound to represent every object with its appropriate

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accessories; the second, besides being very often open in a lesser degree to the same objection, has the further disadvantage of accomplishing its object very imperfectly. The wisest course for the artist is boldly to face the difficulty. That he may do so successfully, many of the works of Rauch, Tieck, Thorwaldsen, Schadow, and others abundantly testify. In the earlier stages of art, an excessive attention to C. may generally be remarked, which though useless, and sometimes hurtful to artistic effect, has proved of the greatest value for historical purposes. The tendency of the earlier schools of art to exhibit C. with an almost painful accuracy and minuteness, is exhibited in the works of the older masters, both of the Italian and German schools. Even during the period of the highest bloom of Italian art, the medieval custom of representing historical, sacred, and ideal characters in the C. peculiar to the time and country of the artist, was in a great measure adhered to. From Paul Veronese, Tintoretto, and others, we may learn the aspect which a marriage-feast in the palace of a Venetian or Florentine grandee presented, but can form little conception of the C. of that simpler festivity in Cana of Galilee, or of that supper still less sensuous in Jerusalem, which they profess to represent. In the hands of the greater masters, these scenes assumed an ideal character; and in the works of Michael Angelo, Leonardo, and Raphael, C., though still exhibiting something of a native trace, rises into the highest regions of poetical conception. The effort to avoid anachronisms by a previous historical and antiquarian study of the subject, belongs, indeed, almost entirely to the modern European schools of art, and many painters of late have devoted themselves to it to such an extent as almost to forget that it is a means, and not an end, except, indeed, to a mere painter of clothes.

But it is in theatrical representations that attention to C., particularly in its narrower sense, becomes most imperative. When the stage, in Western Europe, commenced in the religious mysteries of the middle ages, the dress adopted was that which belonged to the time and the country. To this dress some fantastical object was generally added to indicate the character intended to be personated. In this position matters remained during the time of Shakspeare in England, of Lope de Vega and Calderon in Spain, and even of Corneille, Racine, and Molière in France. Whether a Greek, a Roman, an Assyrian, or a Turk was represented, the ordinary court-dress of the time was adhered to, and the turban, the helmet, or the laurel-crown was placed on the top of the peruke or the powdered hair. In like manner, shepherdesses and peasant-girls had their hair dressed in turrets like feudal keeps, and long white kid-gloves which covered their hands and arms to the elbow. Towards the middle of the 18th c.. a reform was introduced by the famous actress Clairon, who acted Electra without hairpowder; but Talma was the first who introduced a C. really true to history. Garrick followed in the footsteps of the great Frenchman, though both he and Siddons, during their earlier period, personated the characters of Shakspeare in what has been called the rococo C.—knee-breeches and periwigs. Schlegel's "Hermann," and Goethe's "Götz von Berlichingen," were the first plays which were given in Germany with historical costume.

CO'STUS, or Costus Ara'bicus, an aromatic much esteemed by the ancients, and concerning with great doubt long existed, but which seems now to be ascertained to be the dried root of *Aucklandia Costus*, a plant of the natural order *Compositæ*, sub order *Cynarocephalæ*. It is a native of the moist open slopes surrounding the valley of Cashmere. The roots are there burned as incense. They have a strong aromatic pungent odor, and are employed in protecting bales of shawls from moths.

CO'SWAY, Richard, a very noted painter in his day, was born at Tiverton, Devonshire, in 1740. He early displayed a taste for painting, and between his 14th and 24th year carried off five premiums from the Society of Arts. As a miniature-painter, he was particularly famous, and gained all the patronage of the nobility of his time. His works, in fact, were the fashion, and all attempts at rivalry were useless. Many of them were distinguished by great delicacy, correctness, and beauty, and his drawings were not unworthy of a place beside some of the old masters. The immense sums of money which he made enabled him to live in the most sumptuous style, and to give musical-parties (his wife on such occasions being the principal performer), so far surpassing all other efforts of the kind that they formed

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a feature of the time, and were attended by all the rank, fashion, and intellect of that day. C. died in 1831.

COT, on shipboard, is an officer's hammock. It is made of canvas, in the form of a kind of chest, six feet long, two and a half wide, and one deep. This receptacle is kept out at full length by means of a square wooden frame. The bed or mattress is placed within the C.; and the arrangement is more comfortable than that of a sailor's hammock; but both are alike slung from the rafters or beams of the cabin.

CÔTE-D'OR, a department in the east of France, formed of part of the old province of Burgundy, in lat. 46° 55′—48° 10′ n., long. 4° 2′—5° 30′ e. It has an area of 3350 square miles, with a population, in 1872, of 374,510. The surface is in general rather elevated, and is traversed by a chain of hills forming the connecting-link between the Cevennes and the Vosges. A portion of that range, called the Côte-d'Or ("golden slope"), receives its name (which it gives to the department) on account of the excellence of the wines produced on its declivities. See BURGUNDY WINES. A great part of the department is covered with forests. The valleys and plains are fertile, and there is good pasture-land; but agriculture is in a backward state. C. is watered by the Seine, which rises in the north-west, and by several of its affluents; by the Saone, and by the Arroux, a tributary of the Loire. By means of canals, C. has water-communication with the German Ocean, Mediterranean, English Channel, and Bay of Biscay. The climate is temperate; iron, coal, marble, gypsum, and lithographic stones are found, the first in large quantities. C. is divided into four arrondissements; viz., Beaune, Châtillon-sur-Seine, Dijon, and Semur, with Dijon for a capital.

COTES, Roger, a scientific man of much promise, was born at Burbage, near Leicester, July 10, 1682; but death cut him off on the high-road to fame ere he had attained his thirty-fourth year; not, however, before he had left some marks of his presence in the history of exact science. He was the author of the admirable preface explaining the Newtonian philosophy, and answering objections to gravitation, which was prefixed to the second edition (1713) of Newton's "Principia." Various mathematical papers of his own, tending greatly to the development of logarithms, were published after his death. Short as his life was, his influence on mathematics is clearly traceable. He was held in the highest esteem by the scholars and scientific men of his time; and Sir Isaac Newton is asserted to have said of him that, had he lived, "we should have known something."

CÔTES-DU-NORD (northern coasts), a department in the north-west of France, forming a part of Bretagne, and bounded n. by the English channel, in which are several small islands belonging to C.; lat. 48° 3′—48° 51′ n., long. 1° 53′—3° 35′ w.; area, 2840 square miles; pop. 622,295. The Armoric Hills, called also the Montagnes Noires, and the Menez Mountains, cross the department from east to west. They have a breadth of about sixteen miles, and consist chiefly of granite and clay-slate. These formations give a rude and broken aspect to the coasts. The chief rivers, which are short but navigable, are the Rance, Gouet, Trieux, Guer, and Arguenon. The southern district has the advantage of a considerable length of the canal between Nantes and Brest. Though a great portion of the south and the higher plains is occupied by heath and woods, there are, here and there, fertile spots; and in the north the influence of the neighboring sea is favorable to vegetation. The cultivation of flax and hemp, with pasturage and iron-mining, supply employment in the mountainous districts; while in the sheltered valleys and on the coast-levels all European kinds of grain, with pears and apples and other fruits, are produced; and maize is cultivated, but does not always ripen. The coasts are well supplied with various kinds of fish. The department is divided into the five arrondissements of St Brieuc, Dinan, Loudéac, Lannion, and Guingamp. The chief town is St Brieuc.

COTESWOLD, or Cotswold Hills, a range of oolitic and lias hills, running through the middle of Gloucestershire, from Chipping Camden in the north-east, by Cheltenham and Stroud, to near Bath in the south-west. They are parallel to the Avon and Severn, and separate the Lower Severn from the sources of the Thames. They are 54 miles long, and in some parts 8 broad, and cover 312 square miles, with an average height of 500 to 600 feet. The highest points are Cleave Hill,

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1134 feet, and Broadway Hill, 1086 feet. The soil is a clayey loam, with gravel and stone-brash. The surface is generally bare, with little wood; corn, turnips, and sainfoin are grown, and coarse-wooled sheep fed on them. At Stroud, they are crossed by the Thames and Severn Canal, and the Swindon Junction Railway.

CÖTHEN, or Köthen, an ancient town of Germany, in the duchy of Anhalt, 22 miles south-west of Dessau, and about 83 south-west of Berlin, on a tributary of the Saale, and at the junction of railways from Berlin, Magdeburg, Bernburg, and Leipzig. The streets are broad, the town is neat and well-built, is surrounded by high walls, and is divided into the old and new town. It contains a castle with three towers, several churches and schools, a synagogue, a library, a handsome railway station containing a gaming-house, and various charitable institutions. Sugar from beetroot is largely manufactured here. Pop. (1871) 13,563.

COTHU'RNUS. See BUSKIN.

COTICE, or Cost, in Heraldry, one of the diminutives of the Bend (q. v.). The C. is the fourth part of the bend, and is usually borne in couples, with a bend between them.

COTICÉ, the French term to express that an escutcheon is divided bendways into many equal parts. See BENDY. In English heraldry, anything that is accosted, sided, or accompanied by another heraldic object, is said to be cotised.

COTI'LLON (Fr. under-petticoat), the name of a brisk dance, of French origin, performed by eight persons. It was common in Scotland at the end of the last and beginning of the present century, continuing fashionable till superseded by the quadrille, which is only a new variety of the cotillon.

COTINGA (*Ampelis*), a genus of birds of the family *Ampelidæ* or Chatterers (q. v.), having a rather feeble and deeply-cleft bill, and feeding both on insects and fruits. They are natives of South America, inhabit moist places, and are remarkable for the splendor of the plumage of the males during the breeding-season. Azure and purple are then their prevalent colors. During the year, they are clothed in a tame gray or brown.

COTONEASTER, a genus of plants of the natural order *Rosaceæ*, sub-order *Pomaceæ*, having polygamous flowers; a top-shaped calyx, with five short teeth; five small, erect petals; erect, short stamens; and a top-shaped fruit, the nuts of which adhere to the inside of the calyx, but do not cohere in the centre. The species are pretty numerous, shrubs or small trees; some of them evergreen; with simple undivided leaves, more or less woolly beneath; small flowers in lateral cymes; and small fruit not agreeable to the palate, but the bright color of which, and its remaining on the tree in winter, make them very ornamental. *C. vulgaris* is a deciduous species, a native of hills in Europe and Siberia, and said to be found wild in a single locality in Wales. *C. tomentosa* is also found in the Alps. Most of the species are natives of mountainous parts of Asia; they are sufficiently hardy for the climate of Britain, and have become among the most common of our ornamental shrubs. Some them, as *C. rotundifolia* and *C. microphylla*—both from the north of India—are much used for covering walls.

COTOPA'XI, one of the loftiest of the active volcanoes of the Andes, is situated in the Eastern Cordillera of that colossal range, its lat. and long. being 0° 41′ s., and 78° 42′ w. The summit is 18,887 feet above the sea, or about 9800 feet above the table-land of Quito. The upper part, a perfect cone of 4400 feet in height, is entirely covered with snow, excepting that the immediate verge of the crater looks more like a bare parapet of rock. Humboldt, who attempted to ascend the mountain in 1802, found great difficulty in reaching even the snowy zone, and pronounced the top itself to be absolutely inaccessible. The scoriæ cover the neighboring valleys; the flames have been known to rise 3000 feet; and the roaring of the eruption has sometimes been heard at the distance of 200 leagues.

COTRO'NÉ, a town of Italy, in the province of Catanzaro, built on a point of land projecting into the sea, in lat. 39° 7′ n., long. 17° 10′ e. It is almost surrounded by the Esaro (ancient Æsarus), which here has its embouchure. C. is very strongly fortified. Its streets are dark and narrow, and its port of no importance; pop. above 7000. C., however, possesses interest from its antiquity and its historic

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associations. It owes its origin to a colony of Achæans, as far back as 710 B. C., its ancient name being Croton or Crotona. It soon became prosperous, wealthy, and powerful. Its walls measured 12 miles in circumference, and the territory over which it extended its sway was considerable. Its inhabitants were celebrated for athletic exercises, and they carried off most of the prizes at the Olympic games. Milo was its most renowned athlete. Pythagoras settled here about the middle of the 6th c. B. C.; but the influence which, by means of a league of his formation, he exercised, became obnoxious to the citizens, and he was expelled. About 510 B. C., C. sent forth an army of above 100,000 men to fight the Sybarites, who were utterly defeated, and their city destroyed. The war with Pyrrhus completely ruined the importance of C. and in the 2d c. B. C. it had sunk so low, that a colony of Romans had to be sent to recruit its well-nigh exhausted population. It never afterwards recovered its prosperity. Some ruins belonging to the old, exist in the vicinity of the modern city, the most important of which is a Doric column, part of a once magnificent temple to Juno, on Cape Colonne or Nau (the Naus of the ancients).

COTTA, the name of a very old German publishing-house, established at Tübingen in 1649, and still one of the most flourishing in Germany. The family came from Italy about the beginning of the 15th century. Its most prominent member was Joh. Friedr. Freiherr von C., a meritorious theologian of the 18th century.

Joh. Friedr., Freiherr von C., one of the most eminent publishers that Germany ever produced, was born at Stuttgart, 27th April, 1764. He was educated at the university of Tübingen, and for some time practised as an advocate. In 1787 he undertook to conduct the family book-trade at Tübingen; and in 1795 established the "Horen," a literary journal, under the editorship of Schiller. In the same year, he commenced two larger periodicals, the "Politischen Annalen," and the "Jahrbücher der Baukunde." In 1798, he established the "Allgemeine Zeitung"—still published at Augsburg—the "Almanach für Damen," and other works of a similar kind. C. now began to publish the works of the illustrious modern authors of Germany, such as Goethe, Herder, Fichte, Schelling, Jean Paul, Tieck, Voss, Therese Huber, Matthisson, the Humboldts, Joh. von Müller, and Spittler. Besides the periodicals already mentioned, C. established the "Morgenblatt" and the "Literaturblatt," and carried on the "Kunstblatt," founded by Schorn. In 1810, he went to live at Stuttgart. The nobility of his family, which dated far back, was confirmed in his person under the title of Freiherr C. von Cottendorf. In 1824, he introduced the first steam-press into Bavaria, and, shortly after, founded at Munich the Literary and Artistic Institute. He died 29th December 1832. C.'s political principles were liberal, but temperate. In the diet of Würtemberg and afterwards as president of the Second Chamber, he was always the fearless defender of constitutional rights. In manners, C. was simple and pure; and although covered with titles and orders from different governments, he had neither the pride nor the selfishness of a hereditary patrician. The first Wurtemberg proprietor who abolished servitude on his estates, C. also furthered the interests of his farmers by building model-farms, and by setting an example in all rural improvements.

COTTAGE, a small dwelling-house, detached from other buildings, and usually of one story in height. Originally applied to a humble order of dwellings in the country, the term C. now embraces a wide variety of structures, from the cottage *orné* of the French, to the simple but not unattractive cabin in the English rural districts, and the mountain *chalet* of Switzerland. In England, where universal security enables the people to establish dwellings in retired and picturesque situations, the building of cottages has been brought to great perfection; and it may be said with truth, that in no country in the world are there to be seen such a variety of beautiful cottages, scrupulously clean and neat in the interior, and ornamental exteriorly with flowers, shrubs, and bright green lawns. The different styles in which this class of houses may be built, are well described in the elaborate work of J. C. London, on "Cottage Architecture." The subject of proper C. accommodation, as regards the laboring peasantry of England and Scotland, has lately engaged serious attention. See papers in the "Transactions of the National Association for the Promotion of Social Science." The best methods of keeping cows, pigs, poultry, bees, &c., are ordinarily described under the comprehensive title of C. economy. See Cobbet's "Cottage Economy," also "Chambers's Information for the People."

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CO'TTBUS, or Ko'ttbus, a town of Prussia, in the province of Brandenburg, situated on the Spree, about 70 miles south-east of Berlin. It is an ancient place, surrounded by walls, and it has an old castle with towers, a royal palace, a gymnasium, and manufactures of beer, woollens, linen, leather, and tobacco. Pop. (1875) 22,650.

COTTIN, Sophie, a very popular French authoress, was born at Tonneins (Lot-et-Garonne) in 1773. Her maiden name was Ristand. Educated at Bordeaux, she was married when only 17 to M. Cottin, a Parisian banker, who left her a widow at the age of 20. From an early period she had exhibited a love of literature; and to cheer the solitude of her affliction (for she had no children), she now betook herself to the composition of verses, and even ventured on a lengthy history. But it was in fiction she was destined to win unfading laurels. In 1798, appeared "Claire d'Albe;" in 1800, "Malvina;" in 1802, "Amélie Mansfield;" in 1805, "Mathilde;" and in 1806, "Elisabeth, ou les Exilés de Sibérie," a work which has been translated into most European languages, and has always been extraordinarily popular with the young. Madame C. died 25th August 1807.

CO'TTON, an important vegetable fibre, extensively cultivated in various parts of the globe within the 35th parallels of latitude.

1. *Botanical and Commercial Classifications.*—C. is the produce of all the species of the genus *Gossypium*, which belongs to the natural order *Malvaceæ*, and is thus allied to Mallow, Hollyhock, Hibiscus, &c., the general resemblance to which is very apparent both in the foliage and flowers. The species are partly shrubs, partly herbaceous, and either perennial or annual; they are natives of the tropical parts of Asia, Africa, and America, but their cultivation has extended far into the temperate zones. They all have leaves with three to five lobes, which in a very young state are often sprinkled with black points, and rather large flowers, which are mostly yellow, but sometimes in whole or in part purple; the flowers very soon fall off; they grow singly from the axils of the leaves, and are surrounded at the base by three large, heart-shaped, cut or toothed, involucral leaves or bracts, partially growing together as one. The fruit is a 3—5 celled capsule, springing open when ripe by 3—5 valves, and containing numerous seeds enveloped in C., which is generally white, but sometimes yellow, and issues elastically from the capsule after it has burst open. Some of the other kinds have the flowers larger in proportion, and the leaves divided into more numerous and much deeper and narrower lobes, but the general appearance of all is very similar. Difference of opinion exists among botanists as to the number of distinct species, and there are very many varieties in cultivation, the number of which, through climatic influences, and other causes, is continually increasing; but there are certain leading peculiarities on account of which some botanists and practical farmers reduce all, at least of the cultivated kinds, to four primary species—viz., 1. *Gossypium, Barbadense;* 2. *G. Herbaceum* or *Indicum;* 3. *G. Peruvianum;* and 4. *G. Arboreum.* The produce of the first species is the most valuable. The beautiful long-stapled silky wool known as "Sea Island" is a variety, and is grown exclusively upon the islands and a portion of the mainland of Georgia, South Carolina, and Florida; the saline ingredients of the soil and atmosphere being indispensible elements of the growth. The plant bears a yellow flower, and the seeds are small, black, and quite smooth, and the wool is easily separated therefrom; but when sown far inland, away from the saline influences of the coast, the seeds increase in size, and become covered with innumerable short hairs. A large percentage of the crops raised in Alabama, Louisiana, Mississippi, Texas, &c., are also varieties of this species, though, owing to climatic influences, the wool is shorter in staple, and less easily separated from the seeds than Sea Island. The commercial value of the latter kind varies from 1*s.* to 3*s* per lb., rare specimens sometimes realising 5*s.* or 6*s.* per lb. The better descriptions of Egyptian cotton belong to *G. Barbadense*, and bring 1*s.* to 2*s.* 6*d.* per lb. in the Liverpool market. The short-staple varieties, known as New Orleans, Mobile, &c., sell at from 5*d.* to 10*d.*, extra qualities sometimes bringing 1*s.* per pound. *G. herbaceum* is found in India, China, Egypt, &c. The principal commercial varieties are those known as Surat, Madras, and short-stapled Egyptian. It is a small shrubby plant, bears a yellow flower, the seeds are covered with short grayish down, and the staple produced, though not long, is very fine. Its price varies from 3½*d.* to 9*d.* per

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lb. A variety is cultivated in the United States, and the C. known as nankeen is thought to belong to this species. *G. herbaceum* can be profitably cultivated in colder countries than any other species of C. plant. The third species is a native of South America, and the "green seed" C. of the United States appears to be a variety. The stem reaches 10 to 15 feet in height, the flowers are yellow, and the capsules contain eight or ten black seeds firmly attached together in a cone-like mass. The wool is long and strong-stapled, and in value stands next in order to Sea Island and long-stapled Egyptian. Maranham, Bahia, and Macelo are varieties which sell in Liverpool at from 8*d.* to 1*s.* 2*d.* per lb. *G. arboreum* is found in India, China, &c., and, as its name imports, is a large tree-like plant. It bears a red flower, and produces a fine yellowish-white wool. Varieties of it have been long cultivated in the United States, and with the requisite soil and climate, are said to produce a wool somewhat resembling Sea Island.

2. *Cultivation.*—The plant is a very delicate organism, and requires a peculiar soil and climate for its due development. The method of cultivation is much the same in the various countries where the fibre is grown; but the most perfect system is that which obtains in the United States of America. Although the plant is not, strictly speaking, an annual, it is found more profitable to destroy the shrub, after the crop is gathered, and sow new seed every year. The preparation of the land takes place during the winter-months. After the ground has been thoroughly ploughed, and as soon as all symptoms of frost have disappeared, the soil is laid off into rows varying in width from 3 to 4 feet, according to the situation and quality of the soil. The seed is then sown along the centre of the beds in a straight furrow made with a small plough or opener; but in some plantations the seed is sown in holes from 12 to 18 inches apart. The sowing commences in March, and generally continues through April; but sometimes, owing to late spring frosts, the planting is prolonged to May. The young shoot appears above ground in about eight or ten days, and is then and subsequently weeded and thinned. Blooming takes place about the beginning of June—in early seasons, towards the latter end of May; the average date is about June 5. As a general rule, C. is a dry-weather plant. For ploughing, the planter requires just sufficient rain to give the soil a moist and spongy texture. During the early stages of its growth, the crop flourishes best with a warm steamy sort of weather, with an occasional shower until blooming; too much rain being productive of weeds and wood at the expense of wool, whilst a severe drought produces a stunted plant, forced into too early maturity, and resulting in a small and light-stapled crop. A great deal, however, depends upon the position of the plantation; lands situated in hilly or upland districts obviously require more moisture than those lying in the plains and river-bottoms. From the date of blooming to the close of the picking season, warm dry weather is essential. Picking generally commences in August, occasionally in July, and continues until the occurrence of frost—about the end of October or beginning of November—puts a stop to the further growth of the plant. All the available hands of the plantation, young and old, are called into full employment during the harvest. The C. is gathered into baskets or bags suspended from the shoulders of the pickers, and when the crop has been secured, it is spread out and dried, and then separated from the seeds. The latter process was formerly performed by hand—a tedious operation, by which one hand could clean only a pound or so a day; but since the invention of the saw-gin, by Eli Whitney in 1792, the process of cleaning has been both rapid and effectual. This machine is composed of a hopper, having one side formed of strong parallel wires placed so close together as to exclude the passage of the seeds from within. The wool is dragged through the apertures by means of circular-saws attached to a large roller, and made to revolve between the wires, the seeds sinking to the bottom of the hopper. This process is adopted only in cleaning the short-stapled varieties of American C., the seeds of which adhere so firmly to the wool as to require a considerable amount of force to separate them. The Sea Island variety is cleaned by being passed through two small rollers, which revolve in opposite directions, and easily throw off the hard smooth seeds. In India, though the saw and other machine-gins have been introduced in some districts, the wool is mostly cleaned by means of the primitive roller. Both descriptions of gins are used in Egypt and Brazil. The C. cleaned by the roller-gin, being uninjured thereby in staple, realises the better price; but the deterioration caused by the saw-gin is

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compensated for by the greatly increased quantity cleaned; the latter turning out four or five times as much work as the former in an equal space of time, and thereby considerably reducing the expense of cleaning. The introduction of improved gins has very largely increased the production of cotton in Egypt and Brazil during the past fourteen years.

3. *Production and Distribution.*—The oldest C.-producing country is India, in which empire the plant has been grown and manufactured from time immemorial. Early mention is also made of it in the annals of Egypt, and it is believed to have a high antiquity in all parts of Africa. In the western world, it was found by Columbus, but was not so extensively cultivated as in the East; though during the past half-century the culture there has outstripped, both in quantity and quality, the produce of the Old World. Down to the commencement of the present century, the C. consumers of Europe were dependent upon the East and West Indies and the Levant for their raw material; but the inventive genius, superior farming, and greater energy of the planters of the Southern States of America, had, prior to the civil war, almost secured the monopoly of supplying the manufactures of Great Britain and the European continent with this valuable fibre. The average import of American cotton into Great Britain in 1853—1860 reached 79 per cent. of the entire arrivals; during the war the proportion fell to 3½ per cent.; but in 1871, it rose to 59 per cent. We will glance briefly at the history of the trade of the chief C.-growing countries.

United States.—The introduction of the plant is traced as far back as 1536, but the export trade did not commence until two and a half centuries later, the first shipment of importance being about 2000 lbs. in 1770. In 1791, the amount reached 189,316 lbs. In 1792, the invention of the saw-gin gave a new stimulus to the trade, and in 1800, the exports reached 17,789,803 lbs.; from which period the shipments have continued to increase, being over 194,000,000 lbs. in 1821, 277,000,000 lbs. in 1831, 530,000,000 lbs. in 1841, 927,000,000 lbs. in 1851, and about 2,160,000,000 lbs. in 1860. Simultaneously with this rapid increase in production, there was, down to 1851, a gradual decline in the price of the wool, in consequence of improved processes of cultivation and cleaning, and the cheapening of carriage, &c.; the average price in Liverpool, in 1792, being 1s. 6d. per lb.; in 1801, 2s. 2d.; in 1811, 1s. 2d.; in 1821, 9½d.; in 1831, 6d.; in 1841, 6¼d.; in 1851, 5⅛d. per lb.; from which period, however, the downward course was not only checked, but a movement in the opposite direction commenced, the average for 1856—1861 being 7d. per lb.; the low prices current having caused consumption to overtake production. The outbreak of the civil war in 1861, and its continuance until 1865, completely revolutionised the industry of the South. The abolition of slavery added materially to the cost of producing cotton; and this circumstance, along with the general rise which has taken place in values of all kinds during the past twelve or fifteen years, has raised the price at which it will pay to sell American cotton in Liverpool to nearly 8d. per lb., against an average of 7d. per lb. for the five years ended with 1861. During the war, middling Orleans touched 2s. 7½d. per lb. In 1867 (December), there was a decline to 7¾d.—every one expecting a return of old prices; within a few months, there was a reaction to 1s. 1d. Since then the tendency has been downwards: the average for 1875 being 7⅛d., against 8d. in 1874, and 9d. in 1873.

The following table is interesting as showing the wide fluctuations which have taken place in the exports of cotton from the United States during the 12 years ending in 1871, expressed in millions of lbs.

	Weight lbs.	Average Price, cents.		Weight, lbs.	Average Price, cents.
1859—60	1767.6	10.85	1865—66	650.6	43.24
1860—61	807.5	11.07	1866—67	661.5	30.1
1861—62	5.0	23.80	1867—68	784.3	19.3
1862—63	11.4	58.43	1868—69	644.3	24.9
1863—64	10.8	81.43	1869—70	900.4	23.4
1864—65	6.6	86.58	1870—71	1462.9	14.8

In 1871—1872 there was a reduction to 933,000,000 lbs., owing to a failure of the crop. In 1874—75 the weight exported was about 1,178,700,000 lbs., or still considerably less than in the great crop season 1870—1871.

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STATEMENT OF THE PRODUCTION, DISTRIBUTION, AND AVERAGE PRICE OF THE LAST FIFTY CROPS OF AMERICAN COTTON, ACTUAL AND PROPORTIONAL, IN AVERAGE PERIODS OF FIVE YEARS EACH (EXPRESSED IN THOUSANDS OF BALES)

Periods of Five Years.	Average Produce of						Average Total Crop.	Proportional Produce of					
	Georgia via Savannah.	S. Carolina via Charleston.	N. Carolina and Virginia.	Florida via Apalachicola, &c.	Alabama via Mobile.	Louisiana, Miss., Arkansas, Tennessee, and Texas.		Georgia.	S. Carolina.	N. Carolina and Virginia.	Florida.	Alabama.	Louisiana, &c.
1826—30	216	152	91	4	84	302	849	25⅓	17⅞	10¾	⅓	9⅞	35⅓
1831—35	252	194	69	29	143	424	1111	22⅝	17½	6⅓	2⅗	12⅞	38⅓
1836—40	267	249	44	96	295	673	1624	16½	15⅓	2¾	5⅞	18⅛	41⅜
1841—45	246	314	28	141	421	874	2024	12⅛	15½	1⅜	7	20⅞	43⅛
1846—50	285	341	21	161	410	993	2211	12⅞	15½	1	7¼	18½	44⅞
1851—55	338	449	42	168	508	1377	2882	11¾	15½	1⅜	5⅞	17⅝	47¾
1856—60	400	458	63	154	646	1900	3621	12⅜	11	1¾	4¼	17⅝	52½
1866—70	371	192	188	56	314	1299	2420	15⅜	8	7¾	2¼	13	53⅝
1871—75	604	375	469	14	329	1939	3730	16⅛	10	12⅝	⅜	8⅞	52

Periods of Five Years.	Average Exports to				Average Consumption of U. S. (N. of Virginia only.)	Average Stock at close of Season.	Total Average Deliveries.	Proportional Distribution of Total Average Deliveries.				Average Price p. lb. of Whole Crop.	
	Great Britain.	France.	Other Foreign Ports.	Total.				Great Britain.	France.	Other Foreign Ports.	Consumption of United States.	Five Years.	Last Year.
												c.	c.
1826—30	539	173	46	758	114	35	872	61⅞	19⅞	5¼	13	10¼	9 ⅛
1831—35	673	202	41	916	193	56	1109	60⅔	18¼	3¾	17⅜	11⅜	16 3-16
1836—40	966	308	88	1362	255	54	1617	59¾	19	5½	15¾	12⅜	8 1-16
1841—45	1181	347	172	1700	325	91	2025	58¾	17¼	8½	16	7⅜	5 15-16
1846—50	1180	308	229	1717	477	163	2194	53¾	14	10½	21¾	8¼	11
1851—55	1595	387	323	2305	576	126	2881	55⅜	13¼	11¼	20	9⅜	8 ⅜
1856—60	1970	464	485	2919	678	119	3597	54¾	12⅞	13½	18⅞	11⅛	10 ¾
1866—70	1234	237	206	1677	798	95	2477	49⅞	9⅝	8¼	32¼	28	23 ⅜
1871—75	1898	261	507	2666	1062	85	3727	50⅞	7	13⅝	28½	—	—

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The fluctuations in the value and quantity of cotton available during this extraordinary period are strikingly shewn in the following parallel columns relating to the raw cotton imported, and the money paid for it:

	Quantities (Cwts.)	Value.
1860	12,410,000	£35,757,000
1861	11,222,000	38,658,000
1862	4,678,000	31,093,000
1863	5,978,000	56,378,000
1864	7,976,000	78,204,000
1865	8,732,000	66,082,000
1866	12,296,000	77,521,000

Remark here the sudden and tremendous increase in the amount paid for cotton in the latter half of the period; the payment indeed of forty millions sterling more in 1866 than in 1860, for about the same quantity. To shew how India and Egypt benefited by this unprecedented state of affairs, we give (in pounds,* not cwts.) the quantities imported from those countries as compared with the imports from the United States:

	United States.	India.	Egypt.
1860	1,119,000,000	204,000,000	42,000,000
1861	816,000,000	369,000,000	41,000,000
1862	13,594,000	393,000,000	59,000,000
1863	6,394,000	424,000,000	94,000,000
1864	14,148,000	507,000,000	125,000,000
1865	139,000,000	446,000,000	177,000,000
1866	520,000,000	615,000,000	113,000,000

Look, again, at the prices per cwt.:*

	United States.			India.			Egypt.		
	£	s.	d.	£	s.	d.	£	s.	d.
1860	3	0	4	1	17	0	3	15	6
1861	3	12	5	2	17	5	4	4	9
1862	10	2	4	6	5	9	7	1	4
1863	11	5	8	8	18	11	10	11	8
1864	13	11	0	8	9	0	12	15	3
1865	9	18	6	6	5	7	8	16	1

The export of British Indian cotton in 1860 brought only £2,500,000: in 1864 it fetched £34,000,000. The largest quantity imported was in 1866. In 1876 the total value of Indian cotton was £5,874,704.

The figures between 1861—1865 were disturbed by the war. Down to within a few years before the war, the bulk of the crops grown in the various states were shipped at the several ports of each state—Alabama C. at Mobile, Georgia C. at

* The Board of Trade Tables from which these figures are taken are often difficult to consult, on account of the quantities of cotton being stated sometimes in *bales*, sometimes in *cwts.*, and sometimes in *pounds*.

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Savannah, and so on; but the more general introduction of railways has diverted great deal of C. from the old channels. The increase under the head "N. Carolii and Virginia" is owing almost entirely to this cause. One of the most remarkab features in the last line of the previous table is the large proportionate increase in t consumption of the United States. The particulars for three seasons, from 1872 1875, compare as follows:

	1872-73.	1873-74.	1874-7
Receipts at the ports	3,792,000	4,042,000	3,702,0
Direct from plantations	138,000	128,000	130,0
Total crop	3,930,000	4,170,000	3,832,0
	1872-73.	1873-74.	1874-7
Exported to Gt. Britain	1,906,000	1,868,000	1,894,0
" France	253,000	371,000	360,0
" Other Ports	521,000	602,000	431,0
Consumed, North	1,068,000	1,184,000	1,060,0
" South	138,000	129,000	130,0
Total deliveries	3,881,000	4,154,000	3,875,0
Stock, close of Season	91,000	108,000	66,0

East Indies.—After the United States, the most extensive C.-producing count is India. The plant is indigenous to the soil, and the culture and manufacture ha existed from prehistoric times. A century ago, the western world was almc entirely dependent upon the east for its C. goods, but within the past one hundr years the order of things has been almost reversed. The mills of Lancashire a now in successful competition with the famed looms of India, and the natives that vast empire find it cheaper to take out calicoes in exchange for their raw than it is to manufacture their own clothing. The first import of East India C. in Great Britain took place in 1783. The average receipts from that year to 1792, we 65,560 lbs.; from 1793 to 1800, 2,223,089 lbs.; 1801 to 1810, 6,857,000 lbs.; 1811 to 18 24,016,805 lbs.; 1821 to 1830, 18,835,567 lbs.; 1841 to 1850, 79,815,403 lbs.; a 1851 to 1859, 23,017,310 lbs. In 1820 only 224 pounds-weight of C.-yarn and 14,19 117 yards of goods, were exported to India; but in 1874 the figures, including shi ments *vid* Suez, were 88,000,000 lbs. yarn, and 1,263,000,000 yards of calico! It impossible to ascertain the total amount of C. raised in India; but we may obser that the fibre is grown all over the peninsula, and is used for all the purposes f which we employ C., flax, wool, and mostly hemp. The following figures will gi the reader some idea of the extent of the export branch of the trade; they also sh the marvellous expansion incidental to the American war.

WEIGHT AND VALUE OF COTTON EXPORTED FROM INDIA.

	lbs.	£		lbs.	£
1857,	319,653,524	4,437,949	1866,	803,150,424	35,587,389
1860,	845,953,569	5,637,624	1869,	691,196,905	19,778,924
1863,	473,678,421	18,779,040	1872,	809,246,087	21,272,430

Prior to the American war, the supply of C. from India was merely supplemc tary to that from the United States. With a small crop in America, prices a vanced, and the imports from India increased; but with a large American yie prices drooped, and the receipts from India fell off; the surplus produce finding way to China, or being consumed in the interior. This is in a measure still the ca (as is shewn in the above figures), though not to the same extent as formerly. the introduction of improved methods of cultivation, cleaning, &c., the quality Indian C. has been greatly improved; and it is now much more generally used th it was twelve or fifteen years ago.

Brazil—The C. trade of Brazil has undergone a most extraordinary developme during the past ten years, owing to the impetus given to the cultivation of the pla during the American war, and to the general adoption of the saw-gin in place of t roller-gin; this substitution of the American gin has produced quantity at the e

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pense of quality, but the demands of fine spinners have been met by increased supplies from Egypt. The subjoined statement shews the progress made by this branch of Brazilian trade:

IMPORT OF BRAZIL COTTON INTO EUROPE.

		Bales.			Bales.
1831—1835,	average	175,000	1861—1865,	average	201,000
1841—1845,	"	105,000	1866—1870,	"	614,600
1851—1855,	"	149 000	1871—1874,	"	723,000

Egypt.—The C. plant has been known in Egypt from time immemorial; but the trade, properly so called, was first introduced by the celebrated Mehemet Ali, about fifty years ago. The first exportation took place in 1821, and amounted to 944 cantars. During the seven years ending 1827, 1,011,697 cantars were produced, or 144,528 cantars per annum. In the next septennial period, there was a falling off, owing to the withdrawal of a large number of laborers to carry on the wars of the pasha in Soudan, &c., and Syria; the exports therefore only reached 900,521 cantars, or 128,646 per year. The transactions of the subsequent seven years shew a considerable improvement, the total shipments being 1,498,042 cantars, and the annual average 214,006 cantars. During the years 1842—1848, the total rose to 1,549,909 cantars, being an annual average of 221,415 cantars. Since then, the trade has continued to augment. The average shipments of the years 1849—1859 were 473,282 cantars. The cantar is equal to 94 lbs., and there are about 5½ cantars to the bale of the present (1873) average size; so that the exports in 1849—1859 represented 86,000 bales per annum. In 1865, the shipments reached 406,000 bales; in 1875 they amounted to 347,000 bales—or 2,020,000 and 1,908,000 cantars respectively. Great Britain is the principal consumer of Egyptian C., after which comes Austria, then France. The following figures shew the destination of the C. exported from Alexandria during the six years ending September 30, 1875.

EXPORTS TO

	England.	France and Spain.	Austria and Italy.	Total.
1870	177,681	26,356	26,735	230,772
1871	246,518	14,974	52,891	313,878
1872	274,921	22,577	43,967	341,465
1873	299,082	35,251	50,580	384,913
1874	312,172	54,540	43,545	410,257
1875	273,019	34,644	39,651	347,314

Other Countries.—In addition to the districts just passed in review, C. is grown in numerous other countries. During the infancy of the trade our spinners received 75 per cent. of the C. consumed from the West Indies, and the remainder from the Levant; with the great expansion of the culture in America, the supplies from the West Indies gradually fell off, the planters finding it more profitable to occupy their labor and capital in the production of sugar and other growths. Early in the present century, the imports into Great Britain from the West Indies averaged 80,000 bales per annum; but by 1858 the arrivals had dwindled to only 6500 bales, of which only about 2900 bales were from the West Indies, properly so called. Under the stimulus of the high prices which ruled during the C. famine, the supplies from miscellaneous sources—that is, from all countries except the United States, East Indies, Brazil, and Egypt—rose from 6500 bales in 1858, and 9900 in 1860, to 23,000 in 1863, and 131,000 in 1865. With the decline in prices, the import fell to 100,000 in 1868. There was an increase to 166,000 in 1872, owing to the high prices ruling in that year, but the increase was chiefly from Peru. Since that year, with a falling market, the import from "other countries" has annually diminished, being only 89,000 bales in 1875, against 166,000 in 1872, the decrease, like the previous increase, being principally in Peruvian. Fifteen years ago, Peruvian cotton was almost unknown in the Liverpool market; in 1864, the imports reached 27,000 bales; in 1872, they amounted to nearly 105,000 bales; but in 1875 they fell to 56,000 bales.

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Consumption.—Our remarks under this head will be confined to Europe and the United States of America. An immense quantity of C. is consumed annually in India, China, and Africa, but there are no means of ascertaining even an approximation of the amounts so used. There are 11 spinning and weaving mills in Bombay, containing 404,000 spindles, and 4294 looms; and there are 8 mills in other towns of the presidency. "These," says an official Report (1873), "are quite independent of the old native manufactories, and were started entirely in consequence of the inferiority of the piece-goods imported from Manchester." This inferiority was occasioned by the excessive and deleterious method of sizing adopted during the C. famine, in order to meet the demand for low-priced goods, and is a matter which has lately occupied the serious attention of the Manchester Chamber of Commerce. Besides the mills in the Bombay presidency, factories have also been erected in the Bengal and Madras presidencies; and in the North-west and Central Provinces; a considerable native manufacture is also carried on in Burmah.

Great Britain.—The origin of the C. trade of the continent dates as far back as the 10th c., at about which period the staple was introduced into Spain by the Mohammedans. Since that time, the manufacture has continued to expand, more or less, until it has arrived at its present gigantic proportions. Though we have early mention of C. goods in the annals of almost every country of Europe, still the progress of the trade was very slow until within the past one hundred years. Indeed, before the middle of the 18th c., C. goods, properly so called, were never produced—the fabrics manufactured being a mixture of either C. and linen, or C. and wool, C. yarn being used for weft only. It is from the dates of the patents of Wyatt (spinning by rollers, 1738), Arkwright (water-frame, 1769), Hargreaves (jenny, 1770), Crompton (mule, 1779), and Cartwright (loom, 1785), that the rise of our modern manufacture must be dated. The stimulus given to the trade of our own country by these inventions was instantaneous, and when adopted on the continent, a few years after their utility had been sufficiently proved, similar effects followed there. The following figures will give the reader an idea of the rapid extension of the consumption of C. in Great Britain:

IMPORT OF COTTON WOOL INTO GREAT BRITAIN.

Year	American. lbs.	Total of all kinds. lbs.
1701	none	1,976,359
1751	none	2,976,610
1771, one year after Arkwright's loom, and Hargreaves' jenny	none	4,764,589
1780, year after Crompton's mule	none	6,766,613
1785	none	18,400,384
1794	189,316	31,447,605
1794, year after the invention of the saw-gin	487,600	19,040,929
1800		43,879,278
1820	89,999,174	151,672,655
1840	487,856,504	592,488,010
1860	1,115,890,608	1,390,988,752
1871	1,088,677,920	1,778,189,776
1875	816,238,920	1,458,598,470

The following table furnishes particulars of the imports, exports, and home consumption of C. during the past seventy-five years, in average periods of ten years down to 1870, and for the five years 1871—1875.

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SUPPLY AND CONSUMPTION OF RAW COTTON IN GREAT BRITAIN, IN THOUSANDS OF BALES FROM 1801 TO 1875.

Average Periods of Ten Years.	Import.						Export.	Home Consumption.	Total Deliveries.
	United States.	Brazil.	Egypt.	West Indies, &c.	East Indies.	Total.			
1801—10,	127	72	..	81	19	299	8	291	299
1811—20,	159	180	..	54	70	413	31	346	377
1821—30,	436	144	36	26	54	696	65	630	695
1831—40,	818	128	31	22	181	1130	97	1014	1111
1841—50,	1190	118	52	18	209	1577	176	1403	1579
1851—60,	1778	125	106	9	432	2450	362	2070	2432
1861—70,	907	382	227	80	1405	2951	804	2151	2955
1871—75,	1878	525	397	129	1133	3962	727	3183	3910

The bales vary considerably in weight. In 1875 the averages were as follow: American 439 lbs.; Brazilian, 160 lbs.; Egyptian, 602 lbs.; Smyrna, 370 lbs.; West Indian, &c., 205 lbs.; Surat, 390 lbs.; Madras, 300 lbs.; and Bengal, 300 lbs. During the C. famine, a considerable quantity of C. was received from China in bales averaging 266 lbs. The comparative statement in the following table shews the relative importance of the various sources of supply—actual and proportional—in 1802, and on the average in 1828—1830, 1858—1860, and 1874—1875. The quantities are given in millions of pounds—32.1 equal 32,100,000 lbs.

—	Weight in lbs.				Proportion.			
	1802	1828 1830	1858 1860	1874 1875	1802	1828 1830	1858 1860	1874 1875
America	32·1	173·3	970·3	887·9	53·2	72·7	79·7	56 3
Brazil	10·5	30·4	19·4	78·2	17·4	12·8	1·6	4 9
Egypt, &c		5·5	40·1	170·2		2·3	3 3	11·4
West Indies, &c	15·0	5·8	10·8	21·2	25·0	2·4	0 9	1·4
East Indies and China	2·7	23·2	176·4	386·6	4·4	9·8	14·5	26·0
Total	60·3	238·2	1217·0	1489·1	100·0	100·0	100·0	100·0

The factory returns for 1875 state that there were in Great Britain, in that year, 41,300,000 spindles (including 3,800,000 doubling spindles), and 468,000 looms, and that 479,500 persons were employed in the manufacture. The various buildings and machines are said to have cost £66,000,000, and it has been calculated that a floating capital of £30,000,000 is employed in carrying on the trade. If we take into consideration the persons employed in the building of the mills and making of the machines, and in the buying and selling of the raw and manufactured material, it will be found that something like 4,500,000 individuals are dependent upon the prosperity of the cotton trade for their livelihood. The total quantity of yarn exported in 1875 was 215,000,000 lbs., worth £13,200,000; and the total quantity of calicoes, cambrics, fustians, &c., was 3,480,000,000 yards, worth £52,700,000.

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Besides these, there were £5,000,000 worth of lace, small-wares, &c.; which raises the total value to £70,900,000.

France and Alsace.—The first import of C. into France took place in 1668—viz., 450,000 lbs. *via* Marseilles from the Levant. In 1750, the receipts reached 6,978,568 lbs.; but during the wars of the Revolution and the first Empire, little progress was made. In 1815, the import was 36,200,000 lbs.; in 1825, it rose to 55,150,000 lbs.; in 1836, to 118,000,000 lbs.; in 1846, to 159,000,000 lbs.; in 1856, to 211,000,000 lbs.; in 1860, to 270,000,000 lbs. In 1862, the arrivals fell to 127 millions, owing to the stoppage of supplies from America. In 1869, the consumption was estimated at 242 millions; but the war cut down the figures to 165 millions in 1870, and 185 millions in 1871. In 1874, there was a rise to 208 millions. These latter figures are exclusive of Alsace and Lorraine, which use about 65 million lbs.; making 273 millions for France, as she stood before the war, against 242 millions in 1869. The number of cotton spindles in France is about 5,200,000. In Alsace there are about 1,700,000.

Belgium.—The average import of C. into Belgium in 1836—1840 was about 39,500 bales; in 1846—1850, 56,600 bales; in 1856—1860, 61,000 bales; in 1870, 91,000 bales; and in 1874, 127,000 bales. In the last-named year, 91,000 bales were consumed; part of the remainder was forwarded to Germany, Switzerland, or Alsace, and part was added to stock. The number of spindles in Belgium is variously estimated at from 650,000 to 800,000.

Switzerland.—The trade of this confederation has flourished considerably. In 1833, its consumption was about 6,000,000 lbs.; in 1843, about 22,000,000 lbs.; in 1859, about 28,000,000 lbs.; in 1874, about 59,500,000 lbs. The first spinning-machine was set up at Zurich in 1807. In 1826, the number of spindles was 300,000; in 1850, 400,000; in 1835, 650,000; in 1840, 750,000; in 1845, 850,000; in 1850, 950,000; in 1860, 1,350,000; and at the present time, about 2,100,000. Prior to the Franco-Prussian war, the Swiss spinners received the bulk of their raw material *via* France, but now they are supplied mainly through Holland and Germany. The manufactured products of Switzerland are well liked, and compete successfully with those of England in the various continental markets.

Holland.—The C. trade of Holland is chiefly a transit one. The imports in 1872 reached 268,000 bales; in 1873, 189,000; and in 1874, 168,000 bales. The deliveries were 294,000 in 1872, 180,000 in 1873, and 188,000 in 1874; but only about 28,000 bales per annum were retained for consumption, the remainder passing to Germany, &c. The number of spindles in Holland is about 280,000.

German Empire.—Under this head are included the various political divisions of Germany. The several states have made considerable progress in the production of C. fabrics. The C. is received chiefly through the ports of Hamburg and Bremen, but a considerable quantity is also received *via* Holland and Belgium, while a further portion is received into South Germany from Trieste. The average imports into Hamburg, Bremen, Amsterdam, and Rotterdam, in the five years ended with 1840, reached 109,000 bales; in the five years ended with 1855, they averaged 233,000 bales; in the three years ended with 1874, they averaged 655,000 bales. The deliveries in the last-named period, however, did not exceed 644,000 bales—the balance being retained in stock. The number of spindles in Germany in 1846 was about 815,000; in 1858, 2,000,000; and in 1874, 3,500,000, besides 1,700,000 in Alsace; making a total of 5,200,000. The Germans consume nearly the whole of their own produce, and are besides large buyers of English yarns and goods. The leading seat of the manufacture after Alsace is Saxony; then follow Bavaria, Prussia, Baden, Würtemberg, &c.

Austria.—In the C. trade, Austria has made the least progress of any country on the continent. In 1854, there were in all Austria, including Lombardy and Venice, about 1,583,000 spindles; while in 1872 (including the Italian provinces for the purpose of comparison) there were only 1,900,000—an increase of only 24 per cent. in 18 years. The manufacturers receive nearly the whole of their raw material *via* Trieste. The deliveries from that port averaged about 82,000 bales in the five years ended with 1840; 107,000 in 1851—1855; and 125,000 in the three years ended with 1874. The C. Trade of Trieste has increased considerably since the opening of the Suez Canal, by which means the spinners of Austria and South Germany have been brought into direct communication with India. Formerly a large quantity of C. was annually

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exported from Liverpool to Trieste, but the success of M. Lesseps' enterprise has entirely destroyed this branch of trade.

Italy.—The statistical materials relating to this part of the continent are very scanty. The imports into Genoa and Naples in 1851 amounted to about 31,000 bales; in 1860, they reached 94,000, but a good portion of this was forwarded to Switzerland and other places. In 1870, the import was only 47,000 bales; in 1871, the figures reached 92,000; in 1874, fell to 64,000. There are considerable imports also into Venice and Naples. The number of spindles in Italy is estimated to amount to about 700,000, capable of using 88,000 bales per annum.

Spain.—The C. trade of Spain is the oldest in Europe, but until recently has made the slowest progress of any. During the past twenty-five years, however, things have greatly improved. In 1850, the annual consumption was only about 80,000 bales; in 1860, it reached 106,000; in 1870, 152,000; and in 1874, 189,000. There are in Spain about 1,500,000 spindles, capable of using about 189,000 bales of 370 lbs. each.

Russia.—The C. manufacture of this empire is of comparatively recent origin. The imports of raw C. in 1821—1825 (average of three years) were only 2,700,000 lbs.; in 1833—1835, they reached 6,200,000 lbs.; in 1845—1847, 28,000,000 lbs.; in 1853—1855, 55,000,000 lbs.; in 1858—1860, 94,000,000 lbs.; and in 1869—1870, 100,000,000 lbs., besides a considerable quantity from Bokhara, say from 15,000,000 to 20,000,000 lbs. This immense increase in the consumption of raw C. has considerably curtailed the demand for English yarn. In 1838, we exported 19,311,577 lbs. yarn to Russia, but in 1865, only 1,700,000 lbs.; and in 1872, about 8,000,000 lbs. The number of spindles in Russia is estimated at 2,100,000, capable of using 136,000,000 lbs. of cotton. Except in times of depressed trade, the mills work night and day, each mill having two sets of hands.

Sweden, &c.—There are in Sweden and Norway about 300,000 spindles. The coarser sorts of yarn are produced, and the annual consumption of C. is about 18,000,000 lbs., or 48,650 bales of 370 lbs. each. The C. is imported partly from Liverpool, and partly direct from the United States.

United States.—The first C.-mill built in the United States was in 1791; the second, in 1795; the third, in 1803; the fourth in 1804; followed by eleven more during the next three years. In 1810, there were 31,000 spindles; in 1831, 1,246,508 spindles; in 1850, 3,633,693; in 1860, 5,035,798; in 1868, 6,600,000; and in 1874, 9,415,000. In 1831, the consumption of C. amounted to 182,000 bales; in 1850, 613,000; in 1860, 848,600; in 1868, 968,000; in 1871, 1,178,000; and in 1874, 1,818,000. In 1851—1852 (average of two years), the consumption represented 21 per cent. of the C. grown, but in 1871—1872, 28½ per cent. Europe has therefore had to look to other countries to supply her increased requirements, as we have already shewn in a previous portion of this article.

Down to 1845, supply kept constantly ahead of demand, and, at the close of that year, the stock of C. in Europe reached 1,219,000 bales, or about 27 weeks' consumption, the average rate at that time being about 45,000 bales per week. The result was a very serious fall in prices—middling Orleans descending to 3¾*d.* per pound. The produce of America had almost driven the growth of every other country out of the market, and in 1846, the imports from the United States represented 86 per cent. of the total arrivals! The great decline in values naturally led to a serious reduction in the rate of production, which reduction was further aggravated by unfavorable seasons in the south, and in 1846 the imports from the United States fell to 401 million pounds, and in 1847 to 364 millions, against 626 millions in 1845. Then followed a sharp reaction in prices, and ultimately an important recovery in the amount of supply. Between 1845 and 1856, however, consumption encroached upon production to such an extent, that the stock in Europe at the close of 1856 was only 439,000 bales, or about six weeks' consumption; against 1,219,000 bales, or 27 weeks' requirements, at the end of 1845. In the autumn of 1857, therefore, middling Orleans touched 9½*d.* per pound. Thence to 1860, there was a gradual recovery in stocks, and a corresponding decline in prices; but even at the end of 1860, the stock was only 782,000 bales, or about 9½ weeks' consumption, and though middling Orleans had, in the interval, declined to slightly below 6*d.*, the average price for the five years ended with 1861 was 7*d.* per pound. Then followed the American War, of the effects of which we have already written.

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The following table furnishes particulars of the consumption of C. in Europe and the United States during the forty-nine years from 1826, in average periods of five years down to 1870, and the average for 1871—1874.

STATEMENT OF THE CONSUMPTION OF COTTON IN EUROPE AND THE UNITED STATES FROM 1826 TO 1874 (IN THOUSANDS OF BALES AND MILLIONS OF POUNDS).

In Thousands of Bales.

	1826. 1830.	1831. 1835.	1836. 1840.	1841. 1845.	1846. 1850.	1851. 1855.	1856. 1860.	1861. 1865.	1866. 1870.	1871. 1874.
Consumption:										
Great Britain....	711	903	1156	1368	1458	1895	2265	1669	2639	3209
France.....	263	278	372	415	355	442	527	440	613	2265
Rest of Europe..	148	182	257	314	421	698	963	756	1229	
United States....	114	193	255	375	566	659	810	410	870	1197
Total.....	1236	1556	2040	2472	2800	3694	4565	3275	5351	6671
Sources of Supply:										
America.....	821	1122	1528	1990	2277	2949	3675	1208	2523	3813
Brazil.....	169	175	142	105	131	149	153	201	614	723
West Indies, &c.	53	39	73	57	30	30	35	73	175	214
East Indies, &c..	77	97	159	198	233	352	540	1380	1601	1444
Egypt, &c.....	116	123	138	122	129	214	162	418	438	477
Total.....	1236	1556	2040	2472	2800	3694	4565	3275	5351	6671

In Millions of Pounds.

	1826. 1830.	1831. 1835.	1836. 1840.	1841. 1845.	1846. 1850.	1851. 1855.	1856. 1860.	1861. 1865.	1866. 1870.	1871. 1874.
Consumption:										
Great Britain....	212·3	295·2	405·7	521·3	569·8	750·1	947·3	628·6	973·8	1228·2
France.....	77·8	89·6	127·3	157·3	142·4	178·1	225·5	175·1	222·2	884·5
Rest of Europe..	42·0	58·1	81·1	109·9	158·0	273·3	401·9	280·3	431·2	
United States....	38·5	68·7	96·9	152·5	240·5	281·4	358·8	181·2	381·9	525·2
Total.....	370·6	506·6	711·0	941·0	1110·7	1482·9	1933·5	1265·2	2009·1	2587·9
Sources of Supply:										
America.....	276·7	405·9	585·7	816·3	964·2	1254·7	1633·7	531·7	1108·6	1669·9
Brazil.....	29·5	30·6	25·3	18·9	23·8	27·1	27·7	36·2	99·9	113·9
West Indies, &c.	13·2	9·5	13·4	9·4	6·3	6·3	7·2	14·6	33·2	45·2
East Indies, &c..	25·0	34·2	56·5	72·6	86·7	134·8	207·9	491·3	576·5	522·0
Egypt, &c.....	26·2	26·4	30·1	28·8	29·7	60·0	57·0	191·4	190·9	236.9
Total.....	370·6	506·6	711·0	941·0	1110·7	1482·9	1933·5	1265·2	2009·1	2587·9

In the healing art, C. and the cloth and wadding made from it are used for wrapping up and keeping warm, and of late much more than formerly for binding up burns and wounds. A prejudice formerly prevailed against the use of C., as irritating to wounds; but experience has shewn this opinion to be unfounded, and C. is now used in many hospitals quite as freely as linen.

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Cotton Manufacture.—It has already been remarked that the modern system of C. manufacture dates no further back than about 1769. Prior to the mechanical inventions of Hargreaves, Arkwright, Crompton, and Cartwright, the arts of spinning and weaving were entirely domestic, and the instruments of manipulation much the same as those which had been in use in the East for centuries before. By means of the ancient distaff and spindle, or the more recent spinning-wheel, only *one* a thread at a time was produced, and the process, as may be imagined, was tedious, and not very remunerative; besides which, only a very inferior yarn was the result; for whilst a tolerable thread could be spun from flax, the produce of C. was soft, weak, and uneven, and in weaving was used for *weft* (or *transverse* yarn) only, with linen, woollen, or worsted from the *warp* (or *longitudinal* yarn). Altogether, in the middle of the 18th c. the machinery for spinning was much more imperfect than that for weaving, and the weavers of the time were often at a stand for want of yarn to go on with.

This state of things had long occupied the attention of the thinking portion of the spinners, but without any practical result until the invention of the "jenny," by Hargreaves, about 1767. By this machine, eight threads at a time could be spun against the one of the spinning-wheel. Hargreaves was much abused by the populace of his native town and neighborhood, who feared that the invention would deprive them of all employment; the machine was destroyed, and the inventor compelled to leave his birthplace. Genius, however, ultimately triumphed, and the "spinning-jenny" was patented at Nottingham in 1770. The year previously, Arkwright had patented his "water-frame," or "throstle," for spinning by rollers, by means of which a stronger and much firmer yarn was produced. It was about this period that fabrics composed entirely of C. were woven for the first time, the "jenny" supplying the *weft*, and the "throstle" the *warp*. A few years later, Mr. Crompton brought out a new piece of mechanism, which he styled the "mule-jenny," from its combining the principles of both Hargreaves' and Arkwright's patents; but it had an advantage over both, inasmuch as it produced a much finer yarn than either. The "mule" came into full play in or about 1780, which is the period assigned for the birth of the *muslin* trade. There was now no longer a scarcity of yarn; the fear was, that there would be too much, for it was clear that the hand-loom weavers of the time could not keep up with the improved spinning machinery. But the invention of the "power-loom," by Dr. Cartwright, in 1875, set aside all doubts in this respect; the question now was, whether a sufficient quantity of raw C. could be obtained in order to keep pace with the requirements of the rising manufacture. West India C., which in 1784 averaged 1*s.* 6*d.* per lb., rose to 2*s.* in 1788; 2*s.* 1*d.* in 1792; and 2*s.* 8*d.* in 1798. Great exertions were made to obtain increased supplies from India; but the invention of the saw-gin in America brought the required succor from an unexpected quarter. It was only by means of this machine that the production of the short-stapled C. of the United States could be made at all remunerative. The export of hand-cleaned C. in 1791 was only 189,316 lbs., and in 1792 only 138,328 lbs.; but the year after the appearance of the gin—viz., 1794—the exports rose to 1,601,700 lbs.; in 1795, to 6,276,300 lbs.; and in 1800 to 17,789,808 lbs.

But to return. The first "mule-jenny" contained about *thirty* spindles, which, instead of being stationary, as in the "jenny" and "throstle," were placed on a carriage, which was moved outwards, in order, whilst twisting, to increase the fineness of the thread, and inwards again, to wind the yarn on the spindles. This required the constant attendance of a spinner to wheel the carriage backwards and forwards; but subsequent improvements have gone so far as to produce what is called the self-acting mule, two or three of which only require the assistance of one person, generally a boy or girl, whose place it is to piece any of the threads which may break during spinning. Mules of this construction are made with as many as 1000 or 2000 spindles, sometimes more; and with the self-actor, as now improved, a single thread has been produced measuring upwards of *one thousand miles in length*, and yet weighing but *one pound!*

A word or two on the processes preliminary to spinning. The raw material is received from the various producing countries, packed either in bags or square bales. On arrival at the mill, the C. first enters the *mixing-room*, where it is *sorted*, and the various qualities, which are often contained in a single purchase, laid out in layers

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of equal extent, one over the other, and trodden close together. In this manner, two descriptions of the C. are sometimes placed in one mixing. When Surat, for instance, is scarce and dear, and short-stapled low American plentiful and cheap, spinners of what are called coarse numbers invariably use a mixture of both growths; the same of other kinds, provided there is an approach to equality in length of fibre. C. of different shades of color are also sometimes spun together, in order to produce a particular yarn. A quantity of this *bing*, as it is called, is then raked down from the top to the bottom of the side, a portion of each layer being thus secured. This is carried to the *scutching* or *willowing machine*, by means of which the C. is cleansed from all impurities, such as sand, seeds, leaf, &c. The cleaned C. is then taken to the *spreading-machine*, through which it passes, and is then wound, in a fleecy state, upon a large wooden roller, to be transferred to the *carding-machine*. The latter machine is brought into requisition for the purpose of drawing out the fibres of the C. into parallel layers, so as to facilitate the twisting of them together. Originally, this process was performed by hand. The first improvement was made by Lewis Paul in 1748, and the next by Hargreaves in 1760. Arkwright and subsequent spinners have perfected the machine. The C. was formerly cleaned by hand. The *sliver* is next passed through the *drawing-frame*, which removes all inequalities and reduces the bands to one uniform thickness. Here also several of the slivers are joined together (called *doubling*) so as to form one continuous cord, which is still further lengthened and increased in fineness by the *roving-machine*, whence it passes on to bobbins ready for *spinning*. Under the heads SPINNING and WEAVING, will be found a full description of the various processes above briefly glanced at. Other branches of the subject are treated of under CALICO-PRINTING; CALENDERING; DYEING, &c.

The finer kinds of yarn are spun from Sea Island and long-stapled Egyptian, and from them are fabricated our muslins, laces, &c. From Brazil and the better classes of short-stapled American, come our cambrics, calicoes, shirtings, sheetings, &c., and from the inferior qualities of American and Surat are spun the coarse yarns required for fustians and other heavy fabrics. Yorkshire broadcloths are sometimes half cotton. From warps of C., and wefts of wool or worsted, are formed varieties of Orleans cloths, Coburgs, mousselines de laine, damasks, &c. There are also fabrics composed of silk and C., linen and C., alpaca and C., &c.

Of the total amount of yarn produced, from one-fifth to one-fourth is exported in its raw state. The following figures will give the reader an idea of the progress of our export trade in C. yarns and goods:

YARN.

	Total Spun.	Total Exported.	
	lbs.	lbs.	£
1816	73,987,200	15,740,675	2,628,448
1830	622,840,000	68,678,116	4,133,741
1845	494,766,000	135,766,487	6,968,235
1860	965,993,000	197,243,655	9,870,875
1874	1,120,525,600	220,599,904	14,516,093

MANUFACTURED GOODS EXPORTED.

	Entered by the Yard.		At Value only.	Total Value of Yarn and Goods.
	Yards.	£	£	£
1816	189,263,731	12,809,079	746,643	15,684,170
1830	441,578,498	14,119,770	1,175,153	19,428,664
1845	1,091,686,069	18,029,818	1,196,288	26,119,341
1860	2,776,218,427	40,346,342	1,795,763	52,012,380
1874	8,587,182,479	54,355,800	5,280,477	74,282,370

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In 1818, 14,743,675 lbs. of twist were exported, of which 14,727,882 lbs. went to Europe, and only 1861 lbs. to India and China. In 1843, 149,906,448 lbs. were exported; 128,664,218 lbs. to Europe, 899,746 lbs. to America and Africa; and 12,642,484 lbs. to India and China. In 1874, of the 230,599,000 lbs. exported, 77,488,000 lbs. went to Germany and Holland, 62,781,000 lbs. to India, China, and Japan, 16,829,000 lbs. to Turkey, and 26,746,000 lbs. to Italy.

In 1827, Germany was the best customer, for both our plain and printed cottons. The next largest consumer for *plain* cottons was Italy; then followed the Brazils, United States, Russia, Portugal, East Indies, Holland and Belgium, West Indies, &c.; and for *printed* cottons—British West Indies, United States, Italy, Holland and Belgium, Portugal, East Indies, Brazil, &c. The Netherlands were the principal buyers of our laces and small wares; then Germany, British West Indies, Central America, Brazils, United States, East Indies, Portugal, Russia, Italy, &c. At the present time, the East Indies take nearly one-third of our exported manufactured goods. For *plain calicoes*, our next best customer is China; then follow Turkey, Brazil, Egypt, United States, Portugal, Italy, Germany, &c.; of *printed and dyed calicoes*, Turkey is the largest purchaser; then follow India, Brazil, Germany, United States, France, West Indies, Central America, &c. The United States take nearly one-half of our exports of *laces and patent-net;* then follow Belgium, France, Holland, Germany, &c. The United States take over one-third of our exports of *stockings*) and one-half of our shipments of other sorts of *hosiery;* then follow Australia, the Argentine Republic, &c. One-fourth of the *sewing-thread* exported goes to the United States; then follow Germany, Brazil, Russia, &c.

Subjoined is an estimate of the weight and value of the total production of cotton manufactures in Great Britain, with the cost of cotton consumed, and the balance remaining for wages, all other expenses, interest of capital, and profit for the years 1870, 1872, and 1874 (000's omitted; 1,071,770 = 1,071,770,000):

	1870. lbs.	1872. lbs.	1874. lbs.
WEIGHT.			
Cotton consumed	1,071,770	1,175,345	1,266,129
Waste in spinning	129,310	134,965	145,604
Yarn produced	942,460	1,040,380	1,120,525
Exported in yarn	186,078	211,940	220,599
Do. piece-goods, &c.	616,282	698,840	726,000
Consumption and stock	140,150	129,600	173,926
Total as above	942,460	1,040,380	1,120,525
VALUE.			
Yarn exported	£14,671	£16,710	£14,516
Goods, &c., do	61,424	69,900	66,934
Consumption and stock	17,050	15,660	20,110
Total	£93,145	£102,270	£100,560
Cost of cotton consumed	42,145	48,054	40,225
Left for wages, expenses, profits, &c.	£51,000	£54,216	£60,335

The figures relating to the export of "piece goods," &c., include two-thirds of the goods shipped as apparel, haberdashery, &c. The average annual production of yarn and goods for the three years 1870—72, was 1,018,563,000 lbs., distributed as follows:

	lbs.	Per cent.
Exported to India, China, Japan, &c., including 47,000,000 lbs. yarn	333,000,000	32·50
Exported to all other countries, including 150,166,000 lbs. yarn	529,030,000	51·94
Left for Home Consumption and Stock	156,533,000	15·36
Total as above	1,018,563,000	100·00

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In round numbers, therefore, it may be said that one-third of the total production of cotton goods is exported to the East, one-half to other countries, and one-sixth consumed at home.

With the great improvements which have taken place in the mechanics of the trade, and the reduced price of the raw material, a gradual but considerable decline has taken place in the cost and price of the fabrics produced. The price of 1 lb. of yarn containing 100 hanks, in 1786, was 38*s.*; in 1807, 6*s.* 9*d.*; in 1829, 3*s.* 2*d.*; at the present time, 2*s.* 6*d.* The *cost* of weaving during the last sixty years has been reduced upwards of sixty per cent. A species of calico, selling at 6*s.* per yard towards the close of the last century, can be purchased in our day at as many pence! The average price per yard of *goods* exported in 1815 was 1*s.* 5¼*d.*; in 1825, 10¾*d.*; in 1835, 6½*d.*; in 1845, 3 15 16*d.*; and in 1859, 3 7-16*d.* In 1864 the price rose to 6*d.* per yard, but in 1874 it fell to 3⅛ per yard. The average price per lb. of *yarn* exported in 1815 was 8*s.* 7¾*d.*; in 1825, 1*s.* 11½*d.*; in 1835, 1*s.* 4½*d.*; in 1845, 1*s.* 0¼*d.*; and in 1859, 11¾*d.* In 1864, the average rose to 2*s.* 4¾*d.* per lb.; but in 1874, fell to 1*s.* 3¾*d.* per lb. The most profitable years for spinners are said to have been 1845, 1848, 1859, 1860, and 1871.

The earnings of the work-people are higher at the present time than they have ever been before. The following table furnishes the rates current in 1839, 1849, 1859 and 1875. It will be observed that the proportionate advance during the past sixteen years has been much greater in the lowest than in the highest paid hands:

AVERAGE WEEKLY WAGES.

	1839.	1849.	1859.	1875.
	Week of 69 Hours.	Week of 60 Hours.		
	s. d.	*s. d.*	*s. d.*	*s. d.*
Steam-engine tenders	24 0	28 0	30 0	32 0
Warehousemen	18 0	20 0	22 0	26 0
Carding Department—				
Scutchers (women and girls)	7 0	7 6	8 0	12 0
Strippers (young men)	11 0	12 0	14 0	19 0
Overlookers	25 0	28 0	28 0	32 0
Spinning on Self-acting Mules—				
Minders	16 0	18 0	20 0	25 0
Piecers (women and young men)	8 0	9 0	10 0	16 0
Overlookers	20 0	22 0	26 0	30 0
Throstle Spinning—				
Spinners (girls 14 to 18 years)	4 0	4 6	5 0	9 0
" (women)	7 0	7 6	9 0	13 6
Overlookers	18 0	20 0	24 0	26 0
Ruling—				
Throstle reelers (women)	9 0	9 6	9 0	12 6
Warpers	22 0	22 0	23 0	26 0
Sizers	23 0	23 0	25 0	30 0
Doubling—				
Doublers (women)	7 0	7 6	9 0	12 6
Overlookers	24 0	26 0	28 0	32 0

Other branches shew the same ratio of advance.

The following table exhibits the extent of the manufacture at the close of 1874:

Estimated weight of *cotton* consumed	1,226,129,000 lbs.
" value of same, at 7½*d.* per lb.	£40,236,000
" weight of *yarn* produced	1,120,525,000 lbs.
Declared weight of yarn exported	290,699,000 lbs.
" value of yarn exported (1*s.* 3¾*d.* per lb.)	£14,516,000
Number of yards of goods exported	8,587,139,000 yds.
Declared value of same (5¾*d.* per yard)	£54,856,000
" " other cotton goods exported	£5,380,000

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Total declared value of all cotton manufactures exported....	£74,282,666
Total declared value of all British exports.....	£207,650,000
Proportion of *cotton* exports to *entire* exports per cent.....	25 per cent
Estimated number of persons employed.....	479,000
" average rate of wages per week.....	13s.
" total amount of wages paid in twelve months.....	£15,190,000

ESTIMATED FIXED CAPITAL.

Cost of 41,200,000 spindles, at 25s. to 27s. per spindle, inclusive of building, &c.....	£53,690,000	
Cost of 463,000 power-looms, at £26 each.....	12,038,000	
		£65,728,000

ESTIMATED FLOATING CAPITAL.

Employed in carrying on the routine of business....	£18 000,000	
Cash at bankers.....	12,000,000	
		£30,000,000

The average price of cotton consumed in 1860 was 6¾*d.* per lb.; in 1861, 7¾*d.*; in 1864, 1s. 10½*d.*; in 1867, 10¾*d.*; in 1871, 8¼*d.*; and in 1874, 7¾*d.* The average prices of the principal descriptions in 1871 to 1875 were as follows:

	Uplands. Mid.	Pernam. Fair.	Egypt. Fair.	Dhollera. Fair.	Bengal. Fair.
1871.....	8 9-16*d.*	8¼*d.*	8⅞*d.*	6⅜*d.*	5⅝*d.*
1872.....	10 9-16*d.*	10⅝*d.*	10¼*d.*	7⅛*d.*	5⅝*d.*
1873.....	9*d.*	9⅜*d.*	9 11-16*d.*	6 8-16*d.*	4¾*d.*
1874.....	8*d.*	8¼*d.*	8¼*d.*	5 8-16*d.*	4¼*d.*
1875.....	7⅜*d.*	7 15-16*d.*	8 7-16*d.*	5*d.*	4 8-16*d.*
1875, Dec. 31.	6⅞*d.*	7⅜*d.*	7⅜*d.*	4 11-16*d.*	4¾*d.*

Except Bengal, prices at the end of September and December 1875 were lower than since 1860.

The Cotton Famine.—The American civil war broke out in 1861, and in 1862 our import of cotton fell to 524 million pounds, against 1257 millions in 1861, and 1391 millions in 1860. Increased supplies from India and other sources brought the arrivals up to 669 millions in 1866, 893 millions in 1864, 978 millions in 1864. The war closed in 1865, trade with America was resumed, and the imports in 1866 rose to 1377 million pounds, and the cotton industry shortly afterwards resumed its former dimensions. At the crisis of the famine the mills were not working more than half-time, and in December 1862, 247,000 cotton operatives and others connected with the trade, were out of employment, and 165,000 others only partially employed. In the same month, 234,000 persons, or 24 per cent. of the total population of the districts affected, were in receipt of charitable relief. In 1863, the average number of persons out of work was 189,000, and that of those only partially employed, 122,000; in 1864, the figures were 134,000 and 97,000 respectively; and those for the first five months of 1865, 107,000 and 68,000. During the course of the famine, the losses of the trade amounted to between £65,000,000 and £70,000,000, including from £28,000,000 to £30,000,000 loss of wages to operatives. Of the latter amount about one-fourth was recovered in the form of relief, or in wages for employment in public works, &c. The total sum distributed in charity alone was about £3,000,000. In some districts in 1863, the poor-rate rose to nearly 6s. in the £. In the same year, the average rate for the whole of the cotton districts was 2s. 2¾*d.*, against only 7¾*d.* in 1861.

COTTON FAMINE. The history of manufacturing industry does not present a more striking episode than that which was connected with the effects of the Civil War in America on the cotton manufactures of Great Britain in 1861 and following years.

The years 1859 and 1860, unparalleled for the magnitude of the cotton manufacture, had much to do with the collapse that followed. So rapidly has this branch of industry increased in Lancashire, that the immigrants into that county from other

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districts have varied from 10,000 to 20,000 a year for a long series of years, irrespective of the natural increase of population by the excess of births over deaths. The imports of raw cotton, the exports of manufactured cotton, the number of mills, the number of hands, all were at their maximum in 1860. The imports were 1390 million lbs., of which 1054 millions were worked up in Great Britain. There were 1920 mills in Lancashire, 275 in the adjacent portions of Cheshire and Derbyshire, and enough elsewhere to make up a total of 2650. There were 440,000 hands employed in these mills; by age, 20 per cent. adults and young persons, and 10 per cent. children; by sex, 44 per cent. males, and 56 females. The machinery was worked by steam-engines having an aggregate of 300,000 horse-power. There were more than 30,000,000 spindles, making from 4000 to 6000 revolutions per minute; and 350,000 power-looms. The fixed capital in mills and machinery was valued at £54,000,000; while the money paid for wages in that year was £11,500,000. The cotton goods of various kinds manufactured for home consumption used up 180 million lbs. of cotton, and were valued at £34,000,000; while the exported goods—consisting of 2176 million yards of calico, muslins, &c., and 197 million lbs. of yarn—were valued at the enormous sum of £50,000,000; besides £2,000,000 more for cotton hosiery and small wares. The total value for home consumption and export, £76,000,000, exceeded the total imperial revenue for that year. Considering that, of 1390 million lbs. imported, no less a weight than 1120 millions came from the United States, there is at once evidence afforded of the tremendous effect that would be produced by any stoppage in the American cotton-trade. Irrespective of this, however, there would have been a stagnation in our manufacturing districts in 1861, even if raw cotton had been plentiful and cheap. The manufacturers had glutted all the markets by the wholly unprecedented extent of their operations in 1860. The English warehouses, as well as those elsewhere, were full; and time was needed to carry off the immense stock. There were cotton goods on hand in Great Britain at the end of the year valued at £20,000,000; while in India our merchants continued to pour in goods even when the consignments of 1860 exceeded £17,000,000.

Fort Sumter was bombarded in April 1861. This was virtually the beginning of the American Civil War, and the beginning also of the rise in the price of cotton. A blockade was early established by the Federal government of Washington; and it was only by "running" this blockade that cotton-laden ships could clear from the Southern or Confederate ports. The price of Middling Orleans (the kind of cotton mostly used, and that which governs the price of all other kinds) rose from 7¾*d.* to 9*d.* 10*d.*, and 12*d.*, as the year advanced. There was thus a twofold motive for lessening the operations of the Lancashire mills—the markets were so fully supplied with manufactured goods, that no immediate augmentation was necessary; while the increase in the price of the raw material rendered manufacturing less profitable than before. The Liverpool dealers made colossal fortunes by the enormous rise in price of every bale of cotton which could reach the country from any quarter; while the manufacturers were also prosperous, because they could sell their accumulated stocks of calicoes and yarns at much higher prices than had been obtainable in 1860. It was the operatives who suffered. One by one, the mills were put upon half-time, because the mill-owners had not much inducement to spin and weave, under the extraordinary double influence above adverted to. It was not until autumn, however, that these effects were heavily felt, when there was the enormous quantity of 1000 million lbs. of cotton, raw and manufactured, on hand in Great Britain. When half-time began at the mills in October, there were, in Lancashire and the two neighboring counties, 890 spinning-mills, 523 weaving-mills, 685 spinning and weaving mills, and 152 other cotton-mills of miscellaneous kinds, employing 368,-453 factory-hands; and all these four classes of establishments became equally embarrassed. India or Surat cotton could still be had in considerable quantity, at 10*d.* per lb. instead of its former price of 5*d.*; but it was greatly out of favor, on account of its dirty condition, and the shortness and hardness of its staple. In November, there were 49 mills stopped, throwing out 8063 hands, while 119 were working half-time—placing something like 20,000 persons on half their usual wages. In December, Middling Orleans rose to 12*d.* So singular was the state of things, and so unlike what would be called a "famine," under other circumstances, that the actual quantity of raw cotton in Great Britain at the end of the year (280 million lbs.) was greater than ever before known in the history of the trade; but as the market-price of yarns

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and piece-goods at that time scarcely equalled that of raw cotton *plus* wages, the manufacturer could scarcely operate without a loss; and therefore, he either closed his mill, or placed his hands on half-time. It was not so much a famine of cotton as a famine of employment.

The year 1862 opened very gloomily, Relief committees began to be formed in Manchester, Wigan, Blackburn, Preston, and other towns, to distribute subscribed funds to such of the hands as were totally out of work. The streets were thronged with the unemployed; but there was no disturbance, and scarcely any begging. Sewing-schools were established by ladies in the several districts, to teach the factory girls useful domestic needle-work—of which they are generally very ignorant—to get them to make clothes for themselves and others; and to shield them from the vicious temptations which would beset them during a period of idleness. The ladies also won upon the affection of the girls by reading to them, and sympathising in many ways with their sorrows. Many of the manufacturers set apart large rooms as school-rooms and soup-kitchens for the boys and men, and abundant stores of soup were provided at 1*d.* per basin. The Poor-law Board sent down instructions to the local guardians how to give as much elasticity as possible to the system of parochial relief. In April, Blackburn had only 18 mills on full-time out of 84, the rest being either on half-time or closed; and there were 9000 of the inhabitants receiving parochial relief. Most of the other towns were in nearly as bad a plight. In May, matters were worse; Preston had 10,000 operatives out of work, and Blackburn had just about half-employment for 27,000. Middling Orleans rose in price to 15*d.*, and manufacturers had more inducement to speculate in cotton than to spin it. Meanwhile, great efforts were made to assist the distressed operatives. The letters of a "Lancashire Lad" in the "Times," with the text, "Con yo help us a bit?" made a great impression. The "Daily Telegraph" raised a fund of £5000 by its own exertions. The Lancashire landowners established a "Cotton District Relief Fund" in London, to which they subscribed £11,000 in one day; the Lord Mayor established a "Mansion-house Committee," which received subscriptions from all parts of the world; Manchester established a "Central Relief Committee," as a nucleus for various local funds; while a great county meeting brought in £130,000, of which £70,000 was subscribed in one day in one room. Mr Farhall was sent down by the Poor-law Board, as special commissioner, to superintend the plans for parochial relief. A Rate-in-aid Bill was passed through parliament, to enable the government to issue Orders in Council, authorising parishes to raise money on the guarantee of future rates: it was only to be done where the current poor-rate had already reached a high figure, and the money raised was to be applied strictly to mitigate the distress of the operatives. Notwithstanding all these sources of assistance, the work-people became reduced to great distress. "The pawnbrokers' stores," said an eye-witness, "were glutted with the heir-looms of many an honest family. Little hoards were drained to meet the exigences of the time. Many found it the sorest trial of their lives to ask for food; and it is a happy circumstance for all to remember, as it is honorable to those of whom it is recorded, that none suffered more severely than those who had a struggle to overcome their unwillingness to subsist upon food which they had not earned. Rents were falling in arrears, and many a house which had held only one family, was now occupied by three or four, in order to economise rent, fuel, and furniture." Nevertheless, none died of privation, and the average sickness was even less than usual. It was a fact well ascertained that spirit-drinking was less indulged in than in times of full wages. Meanwhile, the manufacturers began to make great profits; the prices of yarns and calicos rose rapidly, and the stocks were sold off which had been so long on hand. Middling Orleans rose to 2*s.* 3*d.* in October, and thus there was less inducement than ever to purchase for the sake of manufacturing. Strange as it may appear, 50,000 bales of cotton were resold by the manufacturers themselves during the year, at the very time when the phrase "cotton-famine" was on the lips of every one; but the simple fact was, that more profit could be made by reselling than by manufacturing.

It was a gloomy winter, that of 1862—1863, for the mill-hands. In October, the loss of wages was estimated at £136,000 per week. In November, there were 208,000 persons in the Lancashire district receiving out-door parochial relief, and 144,000 others aided by subscribed funds; there were at the same time 20,000 mill-

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girls at the sewing-schools. At Christmas, there were 250,000 hands totally out of work; those, and about as many more dependent on them received £40,000 a week from the parishes and committees. Vast sums were sent from various parts of the world to be spent in winter-clothing only, and prodigious stores of second-hand clothing were contributed by private families. As the money relief seldom exceeded 2s. or 2s. 6d. per week per applicant, to purchase clothing out of this was of course impracticable. The small shopkeepers also suffered greatly, for there was only one-third the amount of wages received by their customers per week that had been received two years before. Emigration schemes were much discussed, but were not carried on very largely, because Lancashire men felt convinced that trade would revive after a time. Meanwhile, the *rate* of wages was not lowered; few-mill owners proposed it, and the operatives were rootedly against it; however small the quantity of work, it was paid for at the old rate.

No date can be named for the actual cessation of the distress; it died out by degrees. When the manufacturers had sold off their old stocks, they recommenced buying more to spin and weave; because, although the price of raw cotton was enormously high (2s. 5d. for Middling Orleans in May, 1863), the selling price for calicos and muslins was now proportionably high, and therefore they could manufacture at a profit. In June, 1863, a "Public Works Act" was passed, to enable the government to advance £1,200,000 for public works in the cotton districts—partly to make good drainage, roads, water-supply, &c., and partly to yield £600,000 or £7,000,000 as wages to the unemployed cotton-hands in doing so much of the work as they could manage. The money (to be repaid by parish rates at subsequent dates) was to be advanced by the Exchequer Loan Commissioners on the recommendation of the Poor-law Board, and a government engineer was to examine and sanction the several works to be executed. All these operations were to be confined strictly to the cotton districts, where the distress existed. Mr R. A. Arnold, the resident government inspector of these public works, states in his "History of the Cotton Famine," that by the month of June, 1865, there had been works planned, and in great part executed, under the clauses of this and a supplementary bill, to the amount of £1,846,000. They comprised the making or improving of 276 miles of street and highway, 804 miles of main sewer, reservoirs for 1500 million gallons of water, several parks and cemeteries, and a large area of land-drainage. Nearly 80,000 persons had been fed by the wages of the cotton operatives on these works. The subscriptions to meet the distress reached the vast sum of £2,000,000; while the out-door poor relief was about £1,000,000 more than in an equal period of average times.

COTTON, Gun. See GUN COTTON.

COTTON, Sir Robert Bruce, a distinguished English antiquary, founder of the Cottonian Library, now in the British Museum, was born at Denton, Huntingdonshire, 22d January 1570. He was educated at Cambridge, and soon after taking his degree of B.A. in his 16th year, he commenced those archæological pursuits which have made his name famous, and proved of such immense value to British historians. The dissolution of the monasteries about half a century before, dispersed many valuable collections of manuscripts into private hands, and C. hunted up and purchased these wherever practicable. On account of his eminent abilities and great knowledge, he was frequently consulted by ministers of state on difficult constitutional points and international questions. In 1600, at the request of Queen Elizabeth, who desired to have the views of the Society of Antiquaries on the matter, he wrote "A Brief Abstract of the Question of Precedency between England and Spain." King James, by whom he was made a knight, employed him to vindicate the conduct of his mother, Mary Queen of Scots, and also to examine whether the Roman Catholics, on account of whom some alarm was then felt in the nation, should be imprisoned or put to death. C. took the most humane view of the matter. His intimacy with the Earl of Somerset led him to be suspected of complicity in the death of Sir Thomas Overbury, and in consequence he was imprisoned for about five months. In 1629, a tract entitled "A Project how a Prince may make himself an Absolute Tyrant," was obtained from his library, the tendency of which was considered dangerous to the liberty of the state. His library was accordingly declared unfit for public inspection, and he himself was denied all use of it. His heart being

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bound up in his library, he pined and died in less than two years after, on 6th May 1631.

The COTTONIAN LIBRARY, which now forms so important a part of the British Museum, was, after the death of Sir Robert C.'s son and grandson, who augmented it considerably, invested in trustees for the use of the public. In 1730, the library was removed to Ashburnham House, Westminster, where the royal collection was; and in the following year a fire occurred in the house, in which about 114 out of the 958 MS. volumes of which the library consisted were reported as "lost, burned, or entirely spoiled; and 98 damaged so as to be defective." Fortunately, however, under the care and intelligence of skilful keepers, a great number of these injured volumes have been restored, so that the library now consists of nearly 900 volumes, of which, says Mr Edwards in his "Memoirs of Libraries," "nearly 200 are state papers of the highest value. They include a vast series relating to the diplomatic intercourse between England and almost every state of Europe, extending from the reign of Edward III. to that of James I.; and of these documents, no small proportion consists of the original letters of sovereigns and of statesmen. Even those papers which are not original have a high degree of authority, as being, for the most part, coeval transcripts." The Cottonian Library was transferred to the British Museum (q. v.) in 1757. In addition to the MSS., the Cottonian collection consists of many valuable coins and antiquities.

COTTON GRASS (*Eriophorum*), a genus of plants of the natural order *Cyperaceæ*, having the fruit accompanied with long silky hairs which spring from the base of the ovary. The species are not very numerous; they are natives of the colder regions of the northern hemisphere. Several are found in Britain, and their white cottony fruit bearing spikes are well known in our moors and bogs. The cottony substance has been used for stuffing pillows, making candlewicks, &c. Mr Holl-well has shewn that a firm and beautiful cloth can be made of it; and, according to him, it might be gathered in some places, without cultivation, at a cost of twopence and threepence per pound. The stems of a Himalayan species, *E. comosum* called *Bhabkur*, yield a very strong fibre, and are much employed for making cordage, being simply twisted into cables, of which rope-bridges are usually made; but they are not durable, and require much repairing every year.—C. G. is said to be valuable for sheep-pasture. Its leaves were formerly employed as a remedy for diarrhœa, and the spongy pith of the stem to expel tape-worms.

COTTONWOOD. See POPLAR.

COTTUS, a genus of acanthopterygious fishes, of the *Mailed Cheek* family or *Sclerogenidæ*, having a large depressed head, more or less armed with spines or tubercles, a tapering body, destitute of scales, and two dorsal fins. Some of the species are marine, others inhabit fresh water. Of the latter, the Bull-head, (q. v.) is an example. The marine species are mostly found in northern seas. A few occur on the shores of Britain, of which the most common are the Sea Scorpion (*C. scorpius*) and the Father Lasher (*C. bubalis*) both of which are very often left by the receding tide in rock-pools, and amongst sea-weeds. The greatest size to which they attain on the British coasts is only about 10 inches, but in more northerly seas they become much larger. They form a principal part of the food of the Greenlanders. Notwithstanding their large gill-openings, they live long out of water.

COTURNIX. See QUAIL.

COTYLEDON (Gr. the name of a plant) or Seed-lobe, in Botany, a principal part of the embryo in phanerogamous or flowering-plants. Cryptogamous plants are *Acotyledonous* (q. v.); their seeds or *spores* have no cotyledons. Phanerogamous plants are divided according to their seeds into *Monocotyledonous* (q. v.), having only one C., and *Dicotyledonous* (q. v.), having two cotyledons. With the latter are ranked some *Coniferæ*, remarkable for having more than two cotyledons, which form a sort of whorl. The cotyledons enclose the *plumule* or *gemmule*; and in germination they usually come above ground as the first leaves (seed-leaves) of the young plant—the plumule in dicotyledonous plants appearing between them—and they become at the same more leaf-like; but in some plants, which have thick fleshy cotyledons, they remain underground. In either case, they contain a store of nourishment, by which the young plant is sustained on its first germination. Instances

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of cotyledons remaining under ground, may be seen in the common pea and bean; and instances of cotyledons coming above ground, in the kidney-bean and scarlet-runner, plants of the same natural order. Cotyledons are sometimes very thick, sometimes very thin and delicate; those of the same seed are generally equal, but not always so; they are frequently undivided, but sometimes cut and lobed. The cotyledons or dicotyledonous plants are often simply applied face to face; when if the radicle is folded along their edges, they are said to be *accumbent;* if it is folded on their back, they are *incumbent.* Sometimes the two cotyledons of a seed are *conduplicate,* or laterally folded; sometimes they are *reclinate,* or folded from apex to base; sometimes *convolute,* or laterally rolled up; sometimes *circinate,* or spirally rolled up with the apex innermost. These terms are of importance in descriptive botany, as characters of high value are often furnished by the seed.

COU'CHANT. In Her'aldry, a beast lying down, with his head up, is couchant If the head is down, he is DORMANT.

COUCH GRASS (*Triticum repens*), also called *Wheat Grass, Dog Grass, Quickens,* and *Squitch* or *Quitch,* a grass which, although of the same genus with wheat, is chiefly known to British farmers as a a troublesome weed. It is common in most parts of Europe and North America. It grows to a height of 1½—3 feet, and has two-rowed spikes and flat spikelets, the side of which is applied to the rachis. It is perrennial, and its creeping roots render it extremely difficult of extirpation; they are carefully gathered out of land under cultivation, but they make the plant very useful in fixing loose sandy soils, so as to form pasture. It is not, however, esteemed a very nutritious grass. The roots are sweet and mucilaginous, and are collected at Naples for feeding horses; they have also been dried and ground into meal, to make bread in times of scarcity. A kind of beer is made from them, and in some countries they are much used in domestic medicine. They are diaphoretic and aperient.—The popular name *Squitch,* or *Quitch,* is also given to some other perennial grasses.

COUCHING. See CATARACT.

COUCY, Renaud, Castellan of, a court-poet belonging to the north of France, who flourished probably in the latter part of the 12th century. The love-songs ascribed to him are distinguished above all similar productions of the same epoch by the great warmth of passion displayed. They are addressed, of course, to a mistress, whose name, in accordance with the fashion of the time, is not mentioned. From their contents, we can gather little or nothing of the circumstances of C.'s life, except that he had become a crusader, and had separated himself very reluctantly from the object of his adoration. It is supposed that he accompanied Philippe Auguste and Richard Cœur de Lion to the Holy Land, probably in the service of Raoul Sieur de Coucy, with whom, indeed, he is often confounded. Like Tristan and Isolde, C. and his mistress soon became patterns of true but unfortunate lovers. As early as the first half of the 13th c., the "Roman d' Aventure" gives a very prolix and incredible account of both. The best edition of the "Chansons du Châtelain de C." was edited by Franç Michel (Paris, 1830).

COU'GAR. See PUMA.

COUGHING, considered physiologically, consists, 1st, in a long inspiration which fills the lungs to a greater extent than usual; 2d, in the closure of the glottis, or narrow opening in the organ of voice (see LARYNX), at the commencement of the act of expiration; and, 3d, in the sudden forcing open of the glottis by the violence of the expiratory movement. In this way, a blast of air is driven upwards from the lungs through the mouth, which carries with it any sources of irritation that may have been present in the air-passages. C. may occur from irritation in the back of the throat, in the larynx, trachea, or bronchial tubes, and may be excited by acrid vapors, by irritant gases, or by articles of food or drink—such as even a drop of water or a crumb of bread—making their way into the air-passages instead of into the pharynx, or by excessive or morbid secretion from the walls of the air-tubes, or even by the entrance of cold air, when the lining membrane of the air-passages is abnormally irritable.

It is not very easy to explain to the non-professional reader *how* cough is produced. From the medulla oblongata, or uppermost part of the spinal cord (lying within the cavity of the cranium), there is given off a very important nerve called, from its

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distribution to the lungs and stomach, the pneumogastric nerve (q. v.), which contains both sensory and motor filaments. The sensory filaments are distributed to the mucous lining of the larynx, trachea, &c. Any of the irritating substances already mentioned may produce an impression upon these sensory filaments which, being conveyed to the medulla oblongata, gives rise, through the motor filaments, to the transmission of motor impulses to the various muscles which are concerned in the act of coughing. Other motor nerves, especially those supplying the intercostal muscles and the diaphragm, co-operate powerfully with the motor filaments of the pneumogastric.

The object of C. in the animal economy is unquestionably to guard against the danger of the entrance of mechanical and chemical irritants into the air-passages; and accordingly the mucous membrane, especially of their upper part, is endowed with a most exquisite sensibility which, when aroused by irritation or by a state of disease, provokes incessant coughing until the irritation be allayed or removed. Cough is an exceedingly common symptom of all diseases of the respiration. See PNEUMONIA, CONSUMPTION, BRONCHITIS, CATARRH, &c.

Cough occurs amongst the lower animals under similar conditions. From continued breathing of a close foul atmosphere, the bronchial mucous membrane becomes unduly irritable, hence the prevalence of chronic cough amongst the cows in our over-crowded town-dairies. Chronic cough also occurs in horses, usually as a sequel to repeated attacks of bronchitis. It constitutes unsoundness, is best treated by repeated doses of belladonna and camphor, but often requires for its entire removal a run at grass.

COULOMB, Charles Augustin de, known by his experiments on friction, and his invention of an instrument—the *Torsion Balance* (q. v.)—to measure the force of magnetic and electrical attraction, was born at Angoulême in 1736, and in early life entered the engineers. In 1777, he gained a prize by an essay on the construction of magnetic needles ("Sur les Aiguilles Aimantées). In 1779, his "Théorie des Machines simples" gained the prize offered by the Academy; and in 1781, he was a third time successful in an essay on the friction and resistance of cordage, &c., used in machines. In the same year he was elected as member of the Academy, and his services were employed on all the most difficult problems in mechanics. Having offended certain influential persons by reporting unfavorably on their project of a navigable canal in Bretagne, C. was for some time imprisoned, but received from the States of Bretagne a present of a seconds' watch as a reward of his firm opposition to an expensive and unprofitable scheme. C. lived in retirement during the Revolution; became a member of the Institute, 1804; and died August 23, 1806.

COU'LTER. See PLOUGH.

COU'MARIN, or To'nka Stěaro'pten (see STEAROPTEN), is a camphor-like substance of a very agreeable smell, which gives their fragrance to the well-known Tonka Bean (q. v.), (*Dipterix odorata*), so much used for flavoring snuff; the Woodruff (*Asperula odorata*); the Melilot (*Melilotus officinalis*); a number of grasses, as the sweet-scented Vernal Grass (*Anthoxanthum odoratum*); and the Faam or Faham leaves (*Angræcum fragrans*), much prized among the Asiatics for their vanilla-like scent; and is probably the cause of similar fragrance in many other plants. C. may be procured from Tonka beans by digestion in ether. It crystallises in small prisms, iscolorless, has the smell of the bean, and is scarcely soluble in cold water, but dissolves pretty easily in boiling water. A beverage well known in Germany as *May Drink*, and made of wine and woodruff, derives its flavor from coumarin.

COU'NCIL, or Sy'nod, is an assembly of ecclesiastical dignitaries held for the purpose of regulating the doctrine or discipline of the church. As early as the 2d c., church councils were convened in which only one or two provinces took part, the bishops and presbyters binding themselves to carry out the decisions arrived at in their own communities. These assemblies were commonly held in the chief town or metropolis of the province, and the bishops of such capitals—who, after the 3d c., bore the title of *metropolitan*—were wont to preside over the meetings, and to consider questions of doctrine and discipline which had arisen within the territory. Over these metropolitan councils were established, at a later period, the

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provincial synods, exercising authority over several united provinces and finally the national councils. After the 4th c., when the Christian religion was established in the Roman empire, we read of *œcumenical*, i. e., universal councils, so called because all the bishops of Christendom were invited or summoned by the emperor. In some early synods, we find bishops, presbyters, and others, taking part in the deliberations; but after the opening of the 4th c., only the bishops were convened. According to the doctrine of the Roman Catholic Church, the pope alone, or, by way of exception, in some cases the college of cardinals had the power of convening œcumenical councils, which, in the Catholic view, represent the universal church under the guidance of the Holy Ghost. Questions were determined by the majority of votes, and the pope or his proxy presided and confirmed the resolutions carried in the synod. In matters of faith, the Holy Scriptures and the traditions of the church are the guide; while in lighter matters, human reason and expediency were consulted. In the former, œcumenical councils are held to be infallible, but in other matters of discipline, &c., the latest synod decides questions. The question of the pope's subordination to the decrees of the œcumenical councils was long and warmly debated, but the recent Vatican council may be said to have set the question at rest. Twenty œcumenical councils are recognized in the Roman Catholic Church —9 eastern and 11 western.

1. The synod of apostles in Jerusalem, wherein the relation of the Christian doctrine to the Mosaic law was determined. (See Acts, c. xv.) 2. The first C. of Nice, held 325 A.D., to assert the Catholic doctrine respecting the Son of God in opposition to the opinions of Arius. 3. The first C. of Constantinople, convoked under the Emperor Theodosius the Great (381 A. D.), to determine the Catholic doctrine regarding the Holy Ghost. 4. The first C. of Ephesus, convened under Theodosius the Younger (431 A. D.), to condemn the Nestorian heresy. 5. The C. of Chalcedon, under the Emperor Marcian (451 A. D.), which asserted the doctrine of the union of the divine with the human nature in Christ, and condemned the heresies of Eutyches and the Monophysites. 6. The second C. of Constantinople, under Justinian (553 A. D.), which condemned the doctrines of Origen, Arius, Macedonius, and others. 7. The third C. of Constantinople, convoked under the Emperor Constantine V., Pogonetus (681 A. D.), for the condemnation of the Monothelite heresy. 8. The second C. of Nice, held in the reign of the Empress Irene and her son Constantine (787 A.D.), to establish the worship of images. 9. The fourth C. of Constantinople, under Basilius and Adrian (869 A.D.), the principal business of which was the peace of the eastern and western churches, and the deposition of Photius, who had intruded himself into the see of Constantinople, and the restoration of Ignatius, who had been unjustly expelled. 10. The first Lateran C., held in Rome under the Emperor Henry V., and convoked by the pope, Calixtus II. (1123 A.D.), to settle the dispute on investiture (q. v.). 11. The second Lateran C., under the Emperor Conrad III. and Pope Innocent II. (1139 A. D.), condemned the errors of Arnold of Brescia and others. 12. The third Lateran C., convened by Pope Alexander III. (1179 A. D.), in the reign of Frederick I. of Germany, condemned the "errors and impieties" of the Waldenses and Albigenses. 13. The fourth Lateran C., held under Innocent III. (1215 A. D.), among other matters asserted and confirmed the dogma of transubstantiation and necessity for the reformation of abuses and the extirpation of hersey. 14. The first œcumenical synod of Lyon, held during the pontificate of Innocent IV. (1245 A. D.), had for its object the promotion of the Crusades, the restoration of ecclesiastical discipline, &c. 15. The second œcumenical synod of Lyon, was held during the pontificate of Gregory X. (1274 A. D.). Its principal object was the re-union of the Greek and Latin churches. 16. The Synod of Vienne in Gaul, under Clemens V. (1311 A. D.), was convoked to suppress the Knights Templars, &c. 17. The C. of Constance was convoked at the request of the Emperor Sigismund, 1414 A. D., and sat for 4 years. It asserted the authority of an œcumenical C. over the pope, and condemned the doctrines of John Huss and Jerome of Prague. 18. The C. of Basel was convoked by Pope Martin V., 1430 A.D. It sat for nearly 10 years, and proposed to introduce a reformation in the discipline, and even the constitution of the Roman Catholic Church. All acts passed in this C., after it had been formerly dissolved by the pope, are regarded by the Roman Catholic Church as null and void. 19. The celebrated C. of Trent held 1545—1563 A. D. It was opened by Paul III., and brought to a close under the pontificate of

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Paul IV. The Vatican C., above mentioned, held in 1870, decreed the infallibility of the pope. For details of the more important councils, see NICE, BASEL, CONSTANCE, TRENT, &c.

Among the provincial or local synods convened after the division of the church into east and west, we may mention that of Clermont (1096 A.D.), when the first crusade was proposed, and that of Pisa (1409 A.D.), when three popes were contending for the see of Rome. Among Protestants no general C. has ever been convened; but several particular synods have decided various questions. Of these synods one of the more remarkable was that of Dort in 1618, when Calvin's creed was asserted against the Arminians.

The decrees of the Roman Catholic councils were edited by Mansi (31 vols., 1759—1798). See Hefele's "Conciliengeschichte" (7 vols., 1855—1874).

COUNCIL, Privy. See PRIVY COUNCIL.

COUNCIL, Town. See TOWN COUNCIL.

COUNCIL OF WAR is a conference of officers, in military or naval warfare, on some matter in which the commander wishes to fortify his judgment by an appeal to that of others. The French make a special provision for a Council of Defence in a garrison. The governor or commandant may summon the heads of departments to meet him in consultation whenever he may think such a step desirable; and the opinions expressed at such meetings are placed upon record. The commandant of a garrison generally solicits the opinion of a C. of W. before surrendering to besiegers. The English military code leaves these matters to the discretion of the commander. In the navy, a C. of W. consists usually of flag-officers only; but officers of lower rank occasionally assist.

COUNSEL. See ADVOCATE and BARRISTER.

COUNT (Fr. *comte;* Lat. *comes*). In classical writers, down to the end of the 4th c., the meanings attached to the word *comes* were comparatively few and simple. At first it signified merely an attendant, and differed from *socius* chiefly in expressing a less intimate and equal relation to the person accompanied. Suetonius used it for an attendant on a magistrate. A little later, in Horace's time, it was applied to those young men of family whom it had become customary to send out as pupils under the eye of the governor of a province, or the commander of an army. Very soon the fashion of having similar attendants at home was introduced, and Horace speaks of this necessity as one of the miseries of a high position. The emperor, of course, had many *comites* in this sense; and to these, as he gradually became the centre of power, he transferred the various offices of his household, and even of the state. Around his person these comites formed a sort of council of state, very much resembling that instituted by the first Napoleon. The example of the emperors of the west was followed by the emperors of the east, though at Byzantium the title attached less to the office than to the individual. Most of the titles of our own court officials are translations of those belonging to similar officers in the lower empire. The *comes sacrarum largitionum* was the grand almoner; the *comes curiæ*, the grand-master of ceremonies; the *comes vestiarius*, the grand-master of the wardrobe; *comes equorum regiorum*, the grand equerry, &c. The *comes marcarum*, or count of the marches, there can be little doubt, was the original of the *marquis* of later times. In France, the C. of the palace (*comes palatii nostri*) was the highest dignitary in the state after the *maire* of the palace: and in the 11th c. he had already acquired a rank apart from that of the other counts. He presided in the court of the sovereign in his absence, and possessed sovereign jurisdiction. The habit of instituting counts-palatine was adopted by Spain and England. Those counts, again, who, at a later period, as rulers of provinces, assumed something approaching to sovereign power, arrogated to themselves the right of appointing counts-palatine under them—e. g., the Counts of Chartres, of Champagne, of Blois, Toulouse, &c.; and the ancient houses of Chartres and of Blois continued to claim in perpetuity the title of C.-palatine as that of their eldest sons. Counts of this sovereign class owed their origin to the feebleness of the later Carlovingian kings, under whom they contrived gradually to convert the provinces and towns which they had governed as royal officers into principalities hereditary in their families. It was then that the counts came to be known by the names of their

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counties. Since the great revolution, the title of C. in France has been purely honorary, and has been used with a licence which has almost deprived it even of that character. The title was never used in England, though its Latin equivalent has always been the common translation for Earl (q. v.), and the wife of an earl, from a very early period, has been styled *countess*. For the history of the office in Germany, where it was of great importance, see GRAF.

COUNT AND RE'CKONING, the technical name given in the law of Scotland to a form of process, by which one party compels another to account judicially, and to pay the balance which may be found to be due. In these actions a remit is usually made to an accountant.

COU'NTER APPROA'CH, in Military Engineering, is a trench or passage, cut by the defenders of a fortified post from some of the outworks towards the besiegers, and leading to a battery in a small work. Its object is to enable the defenders to foil the approaches of the besiegers by carrying the fight further away from the body of the place, and enabling the besieged to enfilade the besiegers' batteries and approaches.

COU'NTER-CHANGED, or Co'nter-changed, in Heraldry. When several metals and colors are intermixed, one being set against the other, they are said to be counter-changed.

COUNTERFEIT. See COINING.

COUNTERFORT, in Fortification, is a mass of stone or brickwork added to the revetment of a rampart, in such a way as to form a buttress for resisting the pressure of the mass of earth. Counterforts occur at intervals of about 20 feet, and assist in preventing the earth from pushing down the revetment-wall into the ditch.

COUNTER-GUARD, is an outwork designed to defend the two faces of a bastion or ravelin from a direct fire, so as to retard a breach being made. The C. consists of two lines of rampart parallel to the faces of the bastion or ravelin, and separated from them by a narrow ditch. The crest of the C. must be some three feet lower than that of the works it covers, in order not to obstruct the defence. Lest the enemy should establish a battery on the C., the terre-plein, or flat space behind its parapet, is made very narrow.

COUNTER-IRRITANTS, agents applied to the skin so as to redden (rubefacients), to vesicate (blisters or vesicatories), or to produce pustules, purulent issues, or even sloughs of skin and of the subcutaneous textures. The milder C. are mustard (see CATAPLASM), turpentine applied on warm cloths, and spirit or acetic acid in lotion. The stronger are blisters of cantharides (q. v.) or croton oil (q. v.) or of ammonia (q. v.) or tartar emetic (q. v.), in ointment; setons, caustic or penissues, and the moxa; and above all, the actual cautery (q. v.) or hot iron. None of the stronger C. should be used without careful consideration and medical advice; great mischief is often done by their careless or improper use. C. relieve internal pain, and tend to promote the absorption of morbid effusions.

Amongst horses, C. are not much used for strains and diseases of the joints, but should never be applied, as they too often are, in recent cases, or whilst the part is hot or inflamed. Cantharidine preparations, or ointment of biniodide of mercury, are the most convenient. For cows, use hot fomentations, followed by the smart infriction of mustard-paste; for dogs, soap-liniment, strengthened, if required, by ammonia or turpentine.

COUNTERMARCHING. See MARCHING.

COU'NTERMINE, in Military Engineering, is a gallery or chamber excavated under the glacis or some other part of a defence-work of a fortress. Its purpose is to foil a besieger. In a fortress on a large scale, there are envelope galleries, counter-scarp galleries, listening galleries, galleries of communication, and other subterranean passages, under various parts of the outworks, all for the purpose of assisting the defenders in discovering and frustrating plans laid by the besiegers. Listening galleries are sometimes pushed forward even to the foot of the glacis. In such places, selected men put their ear to the ground, and listen for the approach of the enemy, as denoted by the sound of tools used in driving a mine or gallery o

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attack. The sound of a pickaxe so employed can be heard through the ground at a distance of 60 feet. As there are no openings above, these galleries cannot be driven beyond a certain distance, as the sappers would be stifled for want of air. If a mine be driven to blow up the defence-works, a C. is driven to blow up the besiegers; and sometimes the two parties carry their works so far as to meet in the subterranean passages, and there fight. If there be only a thin wall of earth left between them, they will fire pistols through bored holes, or drive in cartridges or smoke-balls. This terrible work is mostly carried on by sappers and miners.

COUNTER-PASSANT, in Heraldry, when two beasts are passing each other the contrary way.

COU'NTERPOINT, in Music, means the setting of a harmony of one or more parts to a melody. In the early age of the science, notation was represented by mere points on the lines. The setting of parts to a melody already represented by a row of dots or points was therefore called *punctum contrapunctum*. In this respect C. is nothing else but the uniting of various harmonious parts. In a more circumscribed sense, it is the art or manner of accompanying a given melody with other parts. Simple C. is a musical combination where the melody of the parts is not mixed or changed, and may be either all in notes of the same length or of different lengths. If the parts be constructed in regard to one another so that they can be changed, or transposed over or under each other, without alteration in the movement, or injury to the harmony, it is then called double C. As double C. consists of the changing or transposing of one part over or under another, it follows that there must be as many different kinds of it as there are different intervals in the scale. We have, therefore, double C. of the octave, of the twelfth, tenth, ninth, &c. That of the octave is, however, the most useful, as it is more free in movement, and easier to recognise. The first indication of contrapuntal writing is to be found in the 12th. c. by Adam de la Hale, who received a genuine artistic education in the Netherlands, but was far in advance of his time, for his style of music was forbidden to be performed in the church by a bull of the pope, who gave Palestrina an order to replace it with a more simple music. The best masters for C. have been Kirnberger and Albrechtsberger in former times, and in modern times, Schneider, Hauptmann, and Dehn.

COUNTER-PROOF. An impression which is obtained from a freshly-printed proof of an engraving, by laying it, before the ink is dry, upon plain paper, and passing it through the press. By this means the ink is transferred from the wet proof to the plain paper, and a reversed impression is obtained, which is often of use in enabling the engraver to judge of the success of his work.

COUNTERSCARP, in Fortification, is the vertical or nearly vertical side of the ditch nearest to the besiegers, and opposite to the scarp or escarp.

COUNTERSIGN, in military discipline or manœuvres, is a word exchanged between sentinels, inspectors of posts going their rounds, or persons having business with the soldiers in camp or garrison. The C. in use at any particular time is supposed to be known only to those immediately concerned, and is generally a simple word.

COUNTERSIGN, the signature of a secretary, minister, or other subordinate, to any writing signed by the principal or superior, as a guarantee for its authenticity.

COUNTER-TENOR, the highest adult male voice, and the lowest female voices.

COUNTER-VAIR, a heraldic fur. It differs from *Vair* by having its cups or bells of the same tinctures placed base against base, and point against point. The tinctures are OR and AZURE.

COU'NTERVALLA'TION, in Military Engineering, is a chain of posts constructed by the besiegers of a fortified place; it completely surrounds the place at a certain distance, and is intended to prevent sorties of the besieged. The posts are generally small redoubts, either isolated or connected by a line of earthworks. It is only during very protracted sieges that countervallations are constructed. They bear a certain relation to Circumvallation (q. v.).

COUNTIES CORPORATE. In England there are certain cities and towns,

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some having territory annexed to them, some scarcely any, which possess the privilege of being governed by their own sheriffs and other magistrates altogether independently of the counties in which they are situated. The Act 3 Geo. I. c. 5, for regulating the office of sheriff, enumerates twelve cities and five towns in this position. The cities are London, Chester, Bristol, Coventry, Canterbury, Exeter, Gloucester, Lichfield, Lincoln, Norwich, Worcester, and York. The towns are Kingston-upon-Hull, Nottingham, Newcastle-upon-Tyne, Poole, Southampton. From forming no part of the counties with which they were locally connected, they had no share in the county elections. To this extent twelve of the number are now included in their respective counties (2 Will. IV. c. 45, s. 17, schedule G).

COUNTRY DANCE (Fr. *contre-danse*, of which the English term is a corruption), a dance in which as many couples can take part as there is space to accommodate them; at the commencement, the gentlemen being ranged on one side, and the ladies on the other. In its figure, the dancers are constantly changing places, leading one another back and forward, up and down, parting and uniting again. The numerous different figures, which give an interest to this dance, are generally designated with a particular name. The music is sometimes in $\frac{2}{4}$ time and sometimes in $\frac{6}{8}$ time, and the step is more smooth than springing. The C. D. keeps its ground in England, notwithstanding the introduction of many fashionable new dances. See DANCING.

COU'NTY, a term equivalent to shire. Although of the same signification, the terms are applied in no uniform principle. In England and Scotland, the Shires are also called Counties, but in Ireland the term C. seems to be exclusively employed. Such, likewise appears to be the case in the British colonies and United States. See SHIRE.

COUNTY COURTS. The present C. C. were established in 1846, principally for the purpose of affording a cheap and speedy mode of recovering small debts. The old C. C., kept by the sheriffs, were in most cases limited to the recovery of sums not exceeding 40s., and the expense and difficulty of enforcing moderate claims often amounted to a denial of justice. There were a few local courts whose jurisdiction had a rather wider range, but in most cases there were great abuses connected with their management. The courts now take cognizance of all personal actions where the debt or damage claimed is not more than £50, except actions of "ejectment, or in which the title to any corporeal or incorporeal hereditaments, or to any toll, fair, market, or franchise, shall be in question, or in which the validity of any device, bequest, or limitation, under any will or settlement may be disputed, or any malicious prosecution, libel, or slander, criminal conversation, seduction, or breach of promise of marriage." But all the actions here excluded, except actions of criminal conversation, may be tried in the C. C. by consent of the parties concerned. By similar consent, actions for any greater amount than £50 may be tried.

In England and Wales, there are 499 courts, divided into 56 circuits, and presided over by 57 judges, the Liverpool circuit possessing two. The judges are appointed by the lord chancellor, or, where the whole district is in the duchy of Lancaster, by the chancellor of that duchy. Their salaries, owing to extended jurisdiction, are now nearly all £1500, and have, with slight variations, been made uniform throughout the country. Judges resigning from permanent disability are allowed a retiring pension not exceeding two-thirds of their annual salary. Each court has a resident registrar, except in a very few cases, where officials in the old county or local courts claimed vested rights in the first appointments to C. C. offices. The registrars are appointed by the judge, but the lord chancellor, or chancellor of the duchy of Lancaster, may remove them for misconduct. Their salaries depend on the number of *plaints* entered in their districts. In courts under 6000 plaints, they vary from £120 to £180, out of which the registrar provides a staff of clerks. Where the plaints exceed 6000, the salary is £650 and clerks; where they exceed 8000, £700 and clerks. Each court has also a high-bailiff, whose duties are outside, serving process and levying executions. In the smallest courts, their salaries may fall to about £50; in the largest, they may rise to £700 net. There are 23 treasurers, who superintend the accounts of all the courts. They are appointed and removable by the Lords of the Treasury, and their salaries are £700 and £850 per annum. All the property of the court is vested in them.

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In cases above £5, and in cases of replevin and interpleader, either party to a suit may demand a jury. But this is very seldom done. Out of 495,474 causes determined in 1874, only 991 were tried by jury. In 478,323 cases, the plaintiff gained his point. There is no right of appeal where the debt is under £20; but the decisions of the court seem to be willingly accepted as final, as appeals are exceedingly rare even in the heavier causes. There is no imprisonment for debt merely, but a defendant may be committed to prison for contumacy, fraud, or refusal to pay his debts when able to do so. This ground of imprisonment declines, owing to greater reluctance of judges to commit. In 1874, there were 4198 persons imprisoned out of 23,232 warrants issued, the majority having paid before committal. No debtor can be committed for more than six weeks for failure to pay a debt, though he may be committed for such period in respect of each instalment.

In 1874, the amount of debts recovered was £1,293,409, and the costs amounted to £64,901, and the fees on all proceedings were £350,152. There were 831 orders made to protect married women's goods against deserting husbands. There were, out of the whole cases, 28 appeals to the supreme courts. The courts dispose of 61 causes per day. The number of plaints or cases commenced and entered in each court during the year is about 15,200. Attorneys conduct most of the business in these courts, and even they are frequently dispensed with, so that the litigation is inexpensive as well as speedy. In 1875, they obtained power to dispose of all questions between masters and workmen.

The C. C. have also jurisdiction in insolvency cases where the insolvent is not a trader within the meaning of the bankruptcy statutes, and where, being a trader or a prisoner in jail for debt, he owes less than £300. They also have jurisdiction in equity and Admiralty cases, and administer estates of persons who have died leaving not more than £200.

COUNTY RATE, a local tax levied in England and Wales for the purpose of defraying the expenses to which counties are liable, such as the maintenance of bridges, jails, lunatic asylums, prosecutions and costs incident thereto, coroners, &c. It is levied on all property liable to be assessed for the relief of the poor. Rogue money in Scotland, and the grand jury cess in Ireland, are the taxes most nearly resembling the English county rate. See the Poor-law Commissioners' "Report on the Local Taxes of the United Kingdom," 1846.

COUP is a French word signifying "stroke." It is used in certain phrases that have become current in Europe. *Coup d'état*, "stroke of state," means an arbitrary encroachment suddenly effected by the governing authorities upon the constitution of the state, altering or setting aside the prerogatives of other parts of the body politic. *Coup de main*, "a stroke of the hand," is applied, in the language of war, to a sudden and successful attack. *Coup d'œil*, "a stroke or glance of the eye," is applied in speaking of persons who have the faculty of comprehending all the relations of a complicated matter at one survey; or in art it expresses the general effect of a picture or group at first sight. *Coup de theatre*, means properly a trick of the stage to produce an effect by surprise, and is hence applied to any analogous proceeding.

COUPED (Fr. *coupé*), in Heraldry, is used to describe the head, or any limb of an animal cut off from the trunk, and smooth. It is distinguished from *erased*, i. e. forcibly torn off, and therefore ragged and uneven. A distinction is also made between *couped* and *couped close*, the latter signifying that the head or limb is cut off close, leaving no part of the neck or trunk attached to it. When crosses, bars, bends, and the like, are cut so as not to touch the sides of the escutcheon, they are also said to be couped.

COUPLES, the name given in statics to pairs of equal parallel forces acting in opposite directions, and at different points of a body. It is shown in the art. Parallel Forces (q. v.) that when two parallel forces act in opposite directions on a body, they may be replaced by one equal to their difference acting parallel to them in the direction of the greatest at a point *not* between but *beyond* the points where they are applied; and which point recedes the further from their points of application the nearer they approach equality, getting to an infinite distance when they become equal, and when their resultant accordingly is zero. In this limiting case, the for-

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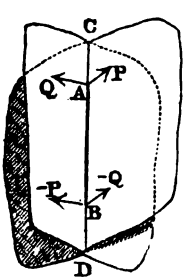
ces constitute a couple; they have no tendency to *translate* the body; their action goes wholly to make it rotate about an axis passing through its centre of gravity, and perpendicular to the plane in which the couple acts. Such being the case, a couple cannot be replaced or counteracted by any single force, for such a force would produce translation; it can only be replaced or balanced by other couples. The length of the straight line which meets the lines of action of the forces at right angles is called the "arm" of a couple, and the product of the force into its arm is called its "moment."

Most of the leading propositions in the theory of C. are readily seen to be true, as soon as they are stated. For instance, as the axis round which a couple tends to make a body rotate passes through the body's centre of gravity perpendicularly to the plane of the couple, it does not matter what position the couple occupies in its own plane. Also, supposing the body to be rigid, the couple may be moved into any plane parallel to its own, provided its new position be rigidly connected with the original position. It is also obvious, on the principle of the lever, that the efficiency of the couple depends on its moment simply, so that its arm may be shortened or lengthened at pleasure, provided the force be increased or diminished as the case may require, so as always to make the product of the force and arm the same. Suppose ropes fastened at the bow and stern of a ship pulling with equal force in opposite directions; they will make the ship turn round an axis through its centre of gravity, at a rate depending on the force applied to the ropes. If the ropes be fastened to opposite points of the vessel nearer midships, it will only turn round at the *same* rate, provided the force applied to the ropes be *increased*; and, on experiment, it would be found that the force must be increased so as that its product into the distance between the ropes shall equal the product of the force in the first case into the length of the ship. Through this we can compound C. acting in the same plane, for we can turn them round till their arms coincide, and then give them a common arm; their forces will then act in the same lines, when their resultant into the arm will be the new couple. So two C. which are situated in planes inclined at any angle to each other may be replaced by a single couple (see fig.). Suppose the C. both to be moved in their respective planes till their arms coincide with the line of intersection of the planes, CD. Bring them then to a common arm in this line, AB. At each end of this arm we shall have a pair of forces, say P and Q, inclined to one another at the angle of inclination of the planes. Their resultant, by the composition of forces, will be a force R, acting in a line between the planes. We shall have then forces R acting at each end of the arm, and evidently in directions parallel and opposite. R × arm, AB, then, is moment of the resultant couple. Having seen how to compound C. whose planes are inclined to one another, the theory of the composition of C. may be said to be complete, for if they are in parallel planes, we know we can bring them into the same plane and to a common arm, and so into a common couple. In statical theory, any number of forces acting on a body, and not in equilibrium, may be reduced to a single force, a single couple, or a single force and a single couple. We have shewn that the C. may all be reduced to one, as well as those forces which do not produce couples. If the single force do not act perpendicularly to the plane of the couple, it can always be compounded with the forces of the couple, so as to reduce the whole to a single force; if it act perpendicularly, then it cannot be compounded with the couple, and the body will have at once a motion of translation and motion of rotation.



COU'PLET. Any two lines which rhyme together may be called a C.; but the term is more frequently used by critics to denote two lines which contain the complete expression of an idea, and are, therefore to a certain extent independent of what goes before or what follows. The poetic wits of the age of Queen Anne excelled in this kind of aphoristic versification. Pope, it has been said, reasons in couplets. For example:

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"'Tis with our judgments as our watches, none
Go just alike, yet each believes his own."

COUPLING, an organ register, by which two or more rows of keys can be connected by a mechanism, so that they can be played together.

COUPON (Fr. *couper*, to cut), a term signifying any billet, cheque, or other slip of paper cut off from its counterpart. It is, however, applied chiefly to a dividend or interest warrant, which is presented for payment by holders of debentures. Coupons in Great Britain must now be stamped.

COURA'NT, in Heraldry, always used for *running*, which is its meaning in French.

COURBEVOIE, a town of France in the department of Seine, situated on the left bank of the river of that name, about 5 miles north-west of Paris. C. has well-built houses, mostly supplied with gardens, and large barracks erected by Louis XV. Its principal manufactures are white-lead and brandy, and it has some commerce by the Seine. Pop. (1872) 9287.

COU'RGNÉ, a market-town of Piedmont, situated at the foot of a hill on the west side of the Orca, 12 miles west-south-west of Ivrea. It has several convents, and a population of 5600.

COURIER, Paul Louis, a French scholar and political writer, was born in Paris, January 4, 1772. He was educated for the army, but, without neglecting his military studies, he shewed a special predilection for ancient literature. In 1793 he became lieutenant of artillery, served in the Italian campaign 1798—1799, and in 1803 was appointed *chef-d'escadron*. After the battle of Wagram, he tendered his resignation, which was accepted. He now proceeded to Switzerland and Italy, returning to his native country in 1819. Up to this period he was known publicly only by his translations from the classics. In 1816 he appeared for the first time as a political pamphleteer, and rapidly obtained a brilliant reputation. The piece in which he made his *début* was the "Petition aux Deux Chambres." In 1819—1820, he published in a journal, called "Le Censeur," a series of letters containing an exposition of his political ideas, which were those of an ardent constitutional reformer. These letters, for keenness, wit, and eloquence, have been compared to those of Pascal. His "Simple Discours" (1821) was directed against the project then entertained of purchasing Chambord for the Duc de Bordeaux in the name of the nation. It is exceedingly vigorous, clever, and sensible, and had a great success. For his audacity, he was tried and condemned to one month's imprisonment. In 1823 he published his "Livret," a kind of memorandum-book; and in 1824 his "Pamphlet des Pamphlets," which is finely called by Armand Carrel "Le Chant du Cygne" (the Swan's Death-song). On the 10th April 1825 he was assassinated near his own house at Veretz, in the department of Indre-et-Loire, a little before sunset. The murderer was never detected. C. was the pamphleteer of the middle class. Manly earnestness, pleasant wit, cutting irony, and admirable sense are his characteristics. Time, which generally dims the lustre of a pamphleteer's reputation, has not touched that of C., which is still as bright as ever.

COU'RIERS. There are two distinct classes of couriers. The first to be noticed are employed by government to carry, securely and expeditiously, important dispatches to and from ambassadors at foreign courts. Active and accustomed to travel, speaking several languages, and with a sufficient idea of their own consequence, they will set out at a moment's notice, pursue their way by steamer, by rail, by hired voiture, or on horseback, with little intermission, by night and by day, until they reach their destination. Acquainted with routes, officials, and methods of clearing the way, and provided with all proper credentials, including a requisite supply of cash, nothing interrupts them in their eager course. Such are *Government C.*, a useful class of public servants. The other class of C. are not dissimilar in accomplishments, but their services are limited to private parties, and coming more generally into notice, we may enter more minutely into a description of their character.

Private Couriers.—These are usually persons of middle age, natives of Switzerland, France, or Germany, who have either been at sometime gentlemen's servants,

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or been long employed as attendants on families while travelling on the continent In some instances they are of English origin and have travelled again and again through Europe with employers who relish the dignity of having a man-servant and dislike personal responsibility and trouble. Of whatever country, the courier has settled down into a perfectly cosmopolitan character. With equal fluency, he speaks English, French, Italian and German, with perhaps Spanish, Portuguese, and Russian; he is acquainted with processes of getting passports and visés; knows the best routes, the best hotels, and where anything curious is to be seen. Acting for the time as a servant, he is not intrusive. Whether by railway or steam-boat, he knows his place, and makes his appearance only when he is wanted. No doubt, the courier is an expensive luxury; his usual wages being from £8 to £10 a month, independently of travelling-fares. His keep at inns is nominally paid by himself; but, of course, it weighs with the hotel-keeper in making out the bill. "A courier, however, though an expensive luxury, is one which conduces much to the ease and pleasure of travelling, and few who can afford one will forego the advantage of his services. He relieves his master from much fatigue of body and perplexity of mind in unravelling the difficulties of long bills and foreign moneys, sparing his temper the trials it is likely to endure from disputes with innkeepers, postmasters, and the like. If clever and experienced, and disposed to consult the comfort of his employer, he is a most useful person. His duties consist in preceding the carriage at each stage, to secure relays of post-horses; he must make arrangements for his employer's reception at inns where he intends to pass the night; must secure comfortable rooms, clean and well-aired beds, and order meals to be prepared, fires to be lighted, taking care that his master is called and the post-horses ordered at the right hour. He ought to have a thorough knowledge of everything that relates to a carriage; he should examine it at the end of each day's journey, to ascertain whether it requires any repairs, which should be executed before setting out. He should superintend the packing and unpacking of the luggage, &c. It falls to the courier to pay innkeepers and post-boys; and he ought to take care that his master is not overcharged. Besides this, he performs all the services of waiting and attendance, cleaning and brushing clothes; and he is not perfectly accomplished unless he has a smattering of the art of cookery" (Murray's "Hand-book for Travellers on the Continent"). As among ordinary domestics, there are honest and dishonest C., and it is of importance that travellers should not hire them without proper recommendations as to character. For places at which C. are to be heard of, we refer to the work just quoted, also to Bradshaw's "Continental Railway Guide." In Paris, information respecting them will be obtained at Meurice's Hotel.

COU'RLAND, or Kurland, a Russian government, and one of what are called the Baltic provinces, in lat. 53°—58° n., long. 21°—27° e. It was formerly an independent duchy—properly, indeed, consisting of two duchies, Courland and Semgall—and belonged, along with Livonia, to the Teutonic Knights. The difficulty of resisting the Russians led to the acknowledgment in 1561, of the feudal sovereignty of Poland; and the last grand-master, Gotthard Kettler, secured the duchies of Courland and Semgall for his family. The country was long distracted by the contentions of two parties, one Russian and the other Polish; and after being for some time very completely under Russian influence, and the scene of many Russian intrigues, it was finally united to Russia in 1795. It contains about 10,500 square miles, with a population, in 1870, of 619,154, mostly Protestants. It is generally a level country, with ranges of low hills, and contains many lakes, bogs, forests, and downs, but some parts have a very fertile soil. The proprietors of land are mostly German; the peasantry, of Lettish or Esthonian extraction, are chiefly engaged in husbandry; there is little manufacturing industry or commerce. The capital is Mitau; but the most flourishing town is Libau.

COURSE, in Building, is a continuous range of stones or bricks of uniform thickness.

COURSES, on shipboard, is a name given collectively to all the lower sails; above them is the group of topsails; and, highest of all, the group of topgallant sails. The C. comprise the mainsail, foresail, main-staysail, fore-staysail, and mizen-staysail.

COURSING, a method of hunting hares by greyhounds, in which the dogs follow

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the game by *sight*, instead of by *scent*. C. is of very ancient date, having been practiced by the Greeks. Within the last twenty years, however, its popularity as a sport has greatly increased, and the breed of the greyhound is now studied with nearly the same care and zest as that of the race-horse. The method pursued in C. is briefly as follows:

Meetings are held in open districts, well frequented by hares, where the greyhounds—technically called "dogs," as foxhounds are technically called "hounds"—are entered by their owners for a variety of stakes, which are to be competed for—C., in this respect, partaking of the nature of a race between horses. The first thing done is to select a judge to decide upon the merits of the best dogs: second, a "slipper" is appointed to hold the dogs in leash, and start them at the hare; and, third, a flag-steward is chosen, who remains near the judge and announces the color of the victorious dog by means of a red or white flag, according as the competitors are arranged. The next thing done is to "beat" the field for a hare. When one is found, the judge usually allows it 80 or 100 yards "law" before he cries to the "slipper" to let the dogs "go." Upon the word "go," the "slipper" liberates the animals by a spring attached to the "slips"—i. e., the long strong cord held by the "slipper" and communicating with the leathern collars fixed round the necks of the dogs. The judge's duties now begin in earnest. He follows the dogs wherever they go, calculating carefully the number of "points" made by each—a "point" being any meritorious achievement on the part of the dogs as when the one outstrips the other at any time, or turns the hare, i. e., causes it to "double"); and at last he adjudges the victory, not *necessarily* to the dog which has killed the hare, but to the one which has made the most points during the course, i. e., which has exhibited the finest qualities of speed, sagacity, endurance, &c.

COURT (Fr. *cour*, Ital. *corte*, from Lat. *cohors* or *chors*, *chortis*, an enclosure or cattle-yard; allied to Polish *grod*, a city; Sw. *gard*; Eng. *yard* and *garden*) was originally applied to the square or space enclosed by the buildings of a feudal castle; and hence it came to denote the persons immediately surrounding a feudal chief or superior. Its application is now confined to the residence and surroundings of sovereign princes. In England, and in other free countries, when we speak of "the court," we mean little more than the family and attendants of the sovereign, viewed not in a private, but a public capacity. The bishops and nobles, the ministers of the Queen for the time being, and other persons entitled to precedence, either on hereditary, official, or personal grounds, are those who habitually encircle the sovereign; and "the court circle," consequently means those persons of distinction, and their families, who are in the habit of approaching the Queen, and of associating with the other members of the royal family. But this circle is one the circumference of which is marked by no absolute line, like that which in France, under the old monarchy, divided the C. from the city.

COURT, Presentation at. The honor of being presented at C., or introduced to the sovereign, is only to be obtained by persons of respectable position, and is a thing sought after not only for the *éclat* of the ceremonial, but as giving a certain stamp of character; for, having been received by the sovereign, a person may with justice expect to be received anywhere. Valuable so far as a credential, a reception at C. is carefully guarded from abuse. At the C. of her Majesty, Queen Victoria, there is a scrupulous and very proper exclusion of all parties, male or female, of damaged reputation. Those who aim at the distinction of being presented at C. belong chiefly to what are called the higher circles—nobility and landed gentry; officers in the army, navy, and higher departments of the civil service; judges, magistrates, church-dignitaries, members of the learned professions; and the wives and daughters of these respective classes. Men of scientific, literary, or artistic attainments do not generally attempt to appear at C., and neither, of course, do the classes engaged in trade. It is usual to be presented on taking office, or on attaining some personal dignity, or on arriving from an important and distant expedition. Young ladies of good family are said "to come out," on being presented at court. What perhaps contributes more than anything else to secure selectness, is the obligation of appearing in "court-dress," an expensive and somewhat fantastic costume of old date; from which only those who assume professional uniforms are exempted. As is well known, the court dresses of ladies

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are superb. It will thus be seen that the notions prevailing among foreigners arriving in England—those from the United States in particular — as to the practicability of indiscriminate presentation at C., are erroneous. It is the duty of the Lord Chamberlain at St James's to furnish information regarding the steps to be adopted by those who desire to be presented at C., either at levées, which are restricted to gentlemen, or at drawing-rooms, which are chiefly, though not exclusively, intended for ladies. The days on which these receptions take place are advertised in the newspapers some days before, with the necessary directions for preventing confusion. Her Majesty's birthday is the occasion on which the greatest reception of the year takes place, but there are no new presentations on that day. Any British subject who has been presented at C. in England, can claim to be presented by the British ambassador at any foreign court. Those who wish to be mere spectators, can obtain tickets to the corridor, where they see the company passing in and out, by applying to the Lord Chamberlain. For this purpose, however, an introduction is required. It is indispensable that the names of gentlemen desiring to be presented, and of the nobleman or gentleman who is to present them, be sent to the Lord Chamberlain's office several days previously, in order that they may be submitted for the Queen's approbation. Gentlemen are also requested to bring with them two large cards, with their names clearly written upon them, one of which is left with the Queen's page in the presence-chamber, and the other is delivered to the Lord Chamberlain, who announces the name to her Majesty. The same rules apply to ladies. Lists of presentations appear next day in the principal London newspapers.

COURT BARON. See COMMON LAW, COURTS OF.

COURT OF COMMON PLEAS. See COMMON LAW, COURTS OF.

COURT OF SE'SSION, the highest civil tribunal in Scotland, was instituted in the reign of King James V., by statute dating 17th May, 1532. The object of its institution was to discharge the judicial functions which originally belonged to the king and his council, and which since 1425 had in a great measure devolved on a committee of parliament as the great council of the nation. The C. of S. consisted at first of 14 ordinary judges and a president. One half of these judges and the president were churchmen, and the practice of appointing ecclesiastics to the bench did not cease for some time even after the Reformation. The king had the privilege of appointing in addition to the ordinary judges, three or four peers or members of his great council to sit and vote with the Lords of Session. When the Lord Chancellor (see CHANCELLOR OF SCOTLAND) was present, he was president of the Session. His office was abolished at the Union, and the habit of appointing peers gradually fell into disuse, though when a peer chances to be present he is still, as a mark of courtesy, accommodated with a seat on the bench. From its foundation till 1808, the C. of S. consisted of one court; in that year it was divided into what are known as the First and Second Divisions, two separate courts possessing co-ordinate jurisdiction. The Lord President is still president of the whole court when called together for consultation, and enjoys other privileges in that capacity; but on ordinary occasions, he officiates simply as president of the First Division. In 1810 another very important change was made. The First Division up to this time had consisted of 7, and the Second Division of 6 ordinary judges, the latter being presided over by the Lord Justice-clerk (q. v.), as the former was by the Lord President. The three junior judges were now taken from the First Division, and the two junior judges from the Second, and appointed to sit as permanent Lords Ordinary in the Outer House. The quorum, which had formerly been four, was now reduced to three in both Divisions. In 1830, the number of judges in the C. of S. was reduced to 13; and the present staff consists of the Lord President, the Lord Justice-clerk, and 11 ordinary judges. Of the five Lords Ordinary, four only sit daily. The judgments of the Outer House, with a few statutory exceptions, are appealable to the Inner House. The youngest judge, or junior Lord Ordinary, officiates in a separate department of the Outer House, called the Bill Chamber (q. v.) where summary petitions, and other branches of business peculiarly requiring dispatch, are disposed of. This department alone is open during the vacations of the court, the judges, with the exception of the Lord President and Lord Justice-clerk, officiating in it in rotation. Either Division of the C. of S. may call in the aid of three judges

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of the other, when equally divided in opinion (31 and 32 Vict. cap. 100). In cases of still greater difficulty, the Lords Ordinary are also called in, and a hearing before the whole court, or *in presence*, as it is called, takes place. Since the 31 and 32 Vict. cap. 100, no hearings before the whole court have taken place; the cases being decided in written arguments submitted to the judges. The judges of the C. of S. are appointed by the crown, and hold their offices for life. No one is eligible to the office unless he has served as an advocate or principal clerk of session for five, or as a writer to the signet for ten, years. Practically, none but advocates are appointed. No action for debt can originate in the C. of S. in which the interest of the pursuer is less than £25. With few exceptions, the judgments of the inferior courts of Scotland are reviewable by the C. of S., but this rule does not apply to the small-debt courts. The judgments of the C. of S. may be appealed to the House of Lords within two years.

COURTALLUM, a town of the district of Tinnevelly, in the presidency of Madras, stands in lat. 8° 56′ n., and long. 77° 20′ e., near the junction of the Eastern and Western Ghauts. Open towards the east, at a height of 700 feet above the sea, it is elsewhere embosomed in hills, having, in its immediate neighborhood, a deep glen which affords easy communication between the opposite shores of Hindustan. The place is a favorite retreat for invalids, deservedly enjoying a reputation for salubrity of air, richness of vegetation, and beauty of scenery. The indigenous flora comprises 2000 species, and many exotics, such as the nutmeg, clove, and cinnamon, have been introduced with success.

COURTESY, or Curtesy, in Law, is the life interest which the surviving husband has in the real or heritable estate of the wife. It is remarkable that, both in England and in Scotland, this customary right should be regarded as a national peculiarity—that in England it should be called the C. of England, and in Scotland the C. of Scotland—whereas it is well known to be peculiar to neither of them. Traces of it are to be found in a constitution of the Emperor Constantine (Code 6, 60, 1); and there can be no doubt that it had found a place, with all the peculiarities which now belong to it, in the *coutume* of Normandy, from whence there is every reason to think that it was transferred to England (Barnage, vol. ii. p. 6); Stephen's "Com." vol. i. p. 264; Fraser's "Domestic Relations," i. p. 635). The four circumstances which are requisite to make a tenancy by C. in England are—marriage, seizin of the wife, living issue, and the wife's death. The rule that the child must have been heard to cry, which at one time was followed in England, is still adhered to in Scotland. It is not necessary, however, in either country, that the child survive; it is enough that it was once in existence, although it should have died immediately after its birth. In both countries, the child must be the mother's heir, and it is consequently said that C. is due to the surviving husband rather as the father of an heir than as the widower of an heiress. By 19 and 20 Vict. c. 120, which enables tenants for life of *settled* estates (see SETTLED ESTATE) to make effectual leases for twenty-one years, subject to the exceptions and provisions in the act contained, a similar power is also conferred upon tenants by the C. of *unsettled* estates (Stephen i. p. 267). As to the law of Scotland on the point, see Hunter on Landlord and Tenant. i. p. 119.

COURTESY TITLES. Titles of honor (q. v.) are imparted by the sovereign or other competent authority. Independently of these, there are C. T. assumed by or given to individuals, and which have no validity in law. The term C. T. is best known in connection with the titles given by popular consent to the sons and daughters of certain peers. English dukes, marquises, earls, and viscounts have several titles, accumulated by distinct patents in their progressive steps in the peerage. Thus, a duke may at the same time be a marquis, an earl, a baron, and a baronet; a marquis may be also an earl, &c.; and an earl is almost always a baron. In ordinary parlance, they respectively take only their highest title. One of the inferior titles so set aside is permitted, as a matter of social dignity, to be assumed by the eldest son. For example, the Duke of Bedford being also Marquis of Tavistock, his eldest son takes the title of Marquis of Tavistock; and the Duke of Buccleuch and Queensberry being also Earl of Dalkeith, his eldest son takes the title of Earl of Dalkeith. When it happens that the inferior title is of the same name as the first, there is a somewhat different usage. For example, the Earl of Gosford

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being also Viscount Gosford, his eldest son, to prevent confusion, takes only the family surname, Acheson, with the prefix Lord—Lord Acheson. The younger sons of dukes and marquises have the courtesy title of Lord prefixed to their Christian and surname; as, for example, Lord Frederick Charles Cavendish, a younger son of the Duke of Devonshire; or Lord Archibald Campbell, a younger son of the Duke of Argyll. The eldest son of an earl, when not a viscount, takes his father's second title of Lord; as, for example, the eldest son of the Earl of Wemyss is styled Lord Elcho. A proper understanding of these conventional customs will serve to clear up some of the perplexities into which foreigners are apt to become involved in thinking of our highly artificial social system. It is to be kept in mind, that titles by courtesy do not raise their bearers above the rank of commoners; and that, consequently, they are eligible for election as representatives to the House of Commons. Very many of the peers, indeed, begin their political career as county or borough representatives under their C. T.; serving in this way a kind of apprenticeship as statesmen before they are advanced, by the decease of their fathers, to the House of Lords.

The daughters of dukes, marquises, and earls, have the title Lady prefixed to their Christian and surname; and in the event of their marrying a person of inferior rank, they retain the title Lady with their Christian name, adding the surname of their husband. Yet these are but courtesy titles. The only valid title they can claim in virtue of their birth, is the prefix Honorable, which is applicable alike to the sons and daughters of peers. The wives of baronets receive the courtesy title of Lady; their lawful designation being Dame. Ladies who had a title by a first marriage, retain it as a matter of courtesy when they are married a second time, though the alliance be with a person without a title—a circumstance sometimes leading to a certain awkwardness in designation. In Scotland, the eldest son of a baron has the courtesy title of Master. For example, the eldest son of Lord Elibank is styled Master of Elibank.

The title Right Honorable is given in some few instances by courtesy to officials, as in the case of the Lord Advocate for Scotland. The judges of the Court of Session in Scotland, on first taking their seat on the bench, assume the courtesy title of Lord along with their own surname or a territorial title. But such titles are used only senatorially. In writing the real name is subscribed. The titles of Mr or Master and Esquire (q. v.), are now given by courtesy to nearly all classes of persons. For an exact definition of titles by courtesy as applicable to members of the peerage, we refer to the "Secretary's Assistant," London, 1831.

COU'RT-FOOL. From very ancient times there existed a class of persons whose business was to while away the time of the noble and wealthy, particularly at table, by all manner of jests and witty sayings. Alexander the Great, Dionysius of Syracuse, Augustus and his successors, maintained such jesters. It was, however, during the middle ages that this singular and repulsive vocation became fully developed, and that the office of jester or fool became a regular and indispensable court office. The symbols of such a personage were—the shaven head; the fool's cap of gay colors, with asses' ears and cock's comb; the fool's sceptre, which was variously formed; the bells, which were mostly attached to the cap, but likewise to other parts of the dress; and a large collar. The rest of the costume was regulated by the taste of the master. Of these professional fools, some obtained a historical reputation, as Triboulet, jester to King Francis I. of France, and his successor, Brusquet; Klaus Narr, at the court of the Elector Frederic the Wise of Prussia, whose jests have been repeatedly printed; and Scogan, court-fool to Edward IV. of England. The kings and regents in Scotland had their jesters, as was usual in their time; and the sarcastic sayings of some of these privileged personages—such as those of Patrick Bonny, jester to Regent Morton—are still remembered among the national *facetiæ*. English court-jesters died out with the Stuarts; one of the last of the race being the famous Archie Armstrong, whose death took place characteristically, on April 1, 1646. Besides the regular fools recognized and dressed as such, there was a higher class, called merry counsellors, generally men of talent, who availed themselves of the privilege of free speech to ridicule in the most merciless fashion the follies and vices of their contemporaries. Of these, Kunz von de Rosen, jester to the Emperor Maximilian I.; John Heywood, a prolific dramatic poet and epigrammatist at the court of Henry VIII.; and Angely, a French courtier, were

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particularly distinguished for talent and wit. In all times, there existed at courts persons who, without becoming jesters by profession, were allowed the privilege of castigating the company by their witty and satirical attacks, or who served as the general butts. Among these were, on the one hand, the Saxon general Kyaw, celebrated for his blunt jests; and on the other, the learned Jacob Paul, Baron Gundling, whom Frederic William I. of Prussia, to shew his contempt for science and the artificial court system, loaded with titles. An interesting history of the whole subject was written by Flögel, entitled "Geschichte der Hofnarren" (Liegn. and Leips. 1789). Such a history forms a kind of barometer of the manners and morals of courts at different times. At a later period, imbecile or weak-minded persons were kept for the entertainment of the company. Even ordinary noblemen considered such an attendant indispensable; and thus the system reached its last stage, and towards the end of the 17th and beginning of the 18th century, was finally abolished. It survived longest in Russia, where Peter the Great had so many fools that he divided them into distinct classes.

COU'RT-HAND, a name given in England to the old, Gothic, or Saxon handwriting, as distinguished from the modern or Italian handwriting. The old way of writing continued to be used in the law-courts after it had been superseded elsewhere, and hence its name of Court-hand.

COURT-MA'RTIAL, a court for the trial of any one belonging to the army or navy, for some breach of military or naval law. The members of the court fill the functions both of judge and jury. In the British army, courts-martial are *general*, *district*, or *regimental*. The first is the only one of the three empowered to award death or transportation for life, as a punishment to the offending person. It consists of thirteen commissioned officers, if so many can be obtained at the time and place; and a deputy judge-advocate is specially appointed to conduct the prosecution. A non-commissioned officer, or a private, may be tried by any one of the three kinds of court; but a commissioned officer only by a general court-martial. A *district* or *garrison* C. may be convened by a field-officer commanding a district or corps, without requiring the sovereign's sign-manual. It consists of a number of members, varying from three to seven, with a captain or higher officer to act as deputy judge-advocate. Such a court tries warrant officers, non-commissioned officers, and rank and file; and can only treat such offences, or alleged offences, as meet with secondary punishment. A *regimental* C. may be convened by the commanding officer of a regiment or detachment; it consists of three or more members; it treats of minor offences, and can award only minor punishments.

In all these kinds of C. the members are sworn in; the court is an open or public one: the vote or sentence is decided by majority, the junior members voting first; but two-thirds of the whole number, in a general C., are necessary to give validity to a sentence of death. Before execution, the sentence of every military court-martial has to be approved and confirmed by the convening authority.

Sometimes *Courts of Inquiry* are held instead of a C., not to try or to punish, but to make an investigation; the members not being on oath. Such a court precedes a court-martial.

Naval courts-martial consist of admirals, captains, and commanders, who try for offences against the naval articles of war. The chief admiral of the fleet or squadron appoints the members; but all captains have a *right* to sit, if not implicated. The C. is open to all the crew and others as spectators. The sentence is final, and needs no confirmation.

COURTRAI (Flemish, *Kortryk*), a town of Belgium, in the province of West Flanders, about 30 miles south of Bruges, lat. 50° 49' n., long. 3° 18' e. C., which is built on both sides of the Lys, is surrounded with walls, and has a castle, a citadel, a fine old bridge flanked with Flemish towers, a noble town hall, and a beautiful Gothic church, founded in 1238 by Baldwin, Count of Flanders. Though a busy manufacturing place, C. is nevertheless very clean. Table damask and other linen are the principal articles of manufacture. There are extensive bleaching-grounds in the vicinity, and the neighboring plains supply fine flax in large quantities to many European markets. Pop. (1875) 27,076. In 1302 the Flemings, citizens of Ghent and Bruges chiefly, won a splendid victory over the chivalry of France beneath the walls of C., more than 700 gilt spurs (worn only by French nobles) being afterwards

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gathered from the dead by the victors. The battle was hence named "the Battle of the Spurs."

COURT-YARD. See FARM BUILDINGS.

COUSIN, Victor, the founder of systematic eclecticism in modern philosophy was born in Paris, November 28, 1792. He studied with brilliant success at the *Lycée Charlemagne*. In 1812 he was appointed Greek tutor in the *Ecole Normale*, and in 1814, Examiner in Philosophy. In the following year he became assistant-professor to Royer-Collard at the Sorbonne, and threw himself heartily into that reaction against the sensualistic philosophy and literature of the 18th c., which was then the order of the day. Following the path of his senior, he became an exponent of the doctrines of the Scotch metaphysicians, but exhibited far more brilliancy, energy, and warmth of expression than the original authors of these doctrines. In 1817, C. visited Germany, where he was introduced to bolder and more speculative systems of philosophy than any he had yet known. He studied successively, or at the same time, Plato, Kant, Jacobi, Fichte, and Schelling. A second visit to Germany, in 1824—1825, had also important consequences. Suspected of carbonarism, he was arrested at Dresden by the police, and sent to Berlin, where he was detained for six months. He took advantage of his compulsory residence in the capital of Prussia to study the philosophy of Hegel, which exercised considerable influence on his susceptible intellect. On his return to France, he took a decided stand against the reactionary policy of Charles X.: and in 1827, when the comparatively liberal ministry of Martignac came into office, C., who had for some years been suspended from his professorial functions, was reinstated in his chair. Meanwhile, C. had appeared as an author. During 1820—1827, he published his editions of Proclus and Descartes, and part of his celebrated translation of Plato, which was finished in 1840, in 13 vols. The year 1828 witnessed the most splendid triumph in the career of C. as a philosophic teacher. It is said that to find an audience as numerous, and as passionately interested in the topics discussed, as gathered round C., it would be necessary to go back to the days of Abelard and other medieval teachers of philosophy. C. was still young, simple and pure in his habits; his doctrines were for the most part new to his hearers, bold and in harmony with the spirit of the time. The finest qualities of the national genius appeared in his lectures, a wonderful lucidity of exposition, an exquisite beauty of style such as no modern or ancient philosopher, excepting Plato, has equalled; a brilliancy of generalisation and criticism that enchanted every one; and a power of co-ordinating the facts of history and philosophy in such a manner as to make each illustrate the other, and reveal their most intricate relations. At this period, C. was one of the most influential leaders of opinion among the educated classes in Paris; and consequently, after the revolution of 1830, when his friend Guizot became prime-minister, C. was made a member of the Council of Public Instruction; in 1832, a peer of France; and later a Director of the *Ecole Normale*. His efforts for the organization of primary instruction are to be seen in those valuable reports which he drew up, from personal observation, on the state of public education in Germany and Holland. In 1840, he was elected a member of the *Académie des Sciences Morales et Politiques*, and in the same year became minister of Public Instruction in the cabinet of Thiers. The revolution of 1848 found in C. a friend rather than an enemy. He aided the government of Cavaignac, and published an anti-socialistic brochure, called "Justice et Charité." After 1849, he disappeared from public life, and died in 1867.

It is more easy to state what philosophical doctrines have received exposition at the hands of C., than to determine precisely what are his own. At first a disciple of Royer-Collard and the Scotch school, he was attached to the psychological method of investigation; afterwards a keen student of the German school, he expounded the views of Schelling with such copious enthusiasm, that he might legitimately enough have been considered a thorough Pantheist. Judging from such a book as "Du Vrai, du Beau, et du Bien" (1853), he seemed more disposed, latterly, to regard philosophy in its religious and æsthetic relations. See ECLECTICISM.

C.'s chief works (besides those already mentioned) are "Fragments Philosophiques" (1826), "Cours de l'Histoire de la Philosophie" (1827). "Ouvrages Inédites d'Abelard" (1836), "Cours d'Histoire de la Philosophie Moderne" (1841), "Cours d'Histoire de la Philosophie Morale au XVIIIe Siècle" (1840—1841),

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"Leçons de Philosophie sur Kant" (1842), "Des Pensées de Pascal" (1842), "Etudes sur les Femmes et la Société du XVIIe Siècle," &c. (1853). C. also contributed a great variety of papers to the literary and philosophic Reviews of France.

COU'SINS, First. See MARRIAGE.

COUTANCES, a town of France, in the department of La Manche, at the confluence of the Soulle and Bulsard. It is built on a conical hill, a few miles from the English Channel, and is a somewhat lugubrious place. Its cathedral, however, is one of the finest specimens of ecclesiastical architecture in the early pointed style in Normandy. One of the towers of the edifice is lighted up with a lantern, that serves as a beacon for ships navigating the channel. C. has manufactures of druggets, muslins, &c., and a trade in corn. Pop. (1872) 7278.

COUTHON, Georges, a fanatic of the French Revolution, was born in 1756 at Orsay, near Clermont, in Auvergne. At the outbreak of the Revolution, he was engaged as an advocate, and in 1790 was elected president of the Tribunal for the district of Clermont. In 1791, he was sent by his fellow-citizens to the National Convention, where he made himself conspicuous by his furious hatred of the court, the priesthood, and the monarchy. In spite of an infirmity which prevented him using his limbs, C. soon became very influential from the rabid violence of his sentiments. He voted for the death of the king without delay or appeal to the country, and (after a brief relapse into moderatism) became a devoted and bloodthirsty partisan of Robespierre. In July 1793, he was appointed a member of the *Comité de Salut Public*, and along with Châteauneuf-Randon and Maignet, was sent against the Lyonnese insurgents. After some opposition, the city was taken, when a multitude of the citizens were put to death. On his return to the Convention, he became quite maniacal, demanding the "impeachment" of all the kings of the earth, and voting for Pitt being declared "the enemy of the human race," and the English nation a "traitor to humanity." The fall of Robespierre brought down C. also. Accused by Fréron, he was thrown into prison, delivered by the mob with whom he was popular, recaptured by the soldiers of the Convention, and executed 28th July 1794, along with St Just and Robespierre.

COUTRAS, a town of France in the department of Gironde, situated on the left bank of the Dronne, about 26 miles north-east of Bordeaux. C. has a considerable trade in flour, and the district produces red wine; but the place is known principally on account of the bloody victory gained here (1587) by Henry of Navarre over the forces of the League. In this battle the Duc de Joyeuse, commander of the Leaguers, was slain, as well as many other great noblemen on the same side. Pop. (1872) 1959.

CO'VENANT, in English Law, an agreement by *deed* (q. v.). In the common law-courts, a special form of action is appropriated to the enforcement of a C. called an Action of Covenant. But in many cases it may also be enforced by the form called an Action of Debt. A. C. may also be *implied*. "Covenant running with the land," is a C. affecting the land into whosoever hands it comes.

COVENANT (Lat. *convenire*, to come together), a contract or agreement; a term much used by theologians, and in its ordinary signification, as well as in its theological use, nearly if not always exactly equivalent to the Hebrew *berith* of the Old Testament and the Greek *diatheke* of the New. Applied to relations established between God and men, the term C. must be understood with a certain modification of the meaning which it bears when employed concerning the relations of men to one another, when two independent parties enter into a C., which they have equal right to make or refuse to make; and is sometimes employed as equivalent to *dispensation*, and the Jewish dispensation is called the *Old* C. (or *testament*, by another translation of *diatheke*), in contradistinction to the Christian, which is called the *New*. God, in his supremacy, is regarded as appointing certain conditions for his creatures, which they cannot but accept, yet their willing consent to these conditions gives to the relation established the nature of a C.: and thus God is commonly said to have made two covenants with man: the *first C. or C. of Works*, with Adam, as the representative of the whole human race, promising life (with perfect happiness), upon condition of perfect obedience, whilst death was threatened as the penalty of transgression; the *second C.* or *C. of Grace*, being that on which depend

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the whole hope and salvation of man, since the first C. was broken, and in which life is freely offered to sinners, and they are simply required to believe in Jesus Christ that they may be saved. This C. God is regarded as having made with Christ, as the representative of his people, and with them in him. The older theologians often speak of the *C. of Redemption* between God and Christ, employing the term *C. of Grace* rather to designate the whole dealings of God with men in giving effect to the C. of Redemption; but the term *C. of Grace* has long been almost universally employed to include all that was comprehended under both terms. The *Abrahamic C.* is the C. of Grace as declared to Abraham, in its particular relation to him and his seed. God is represented in Scripture as sustaining a *C. relation* to his *own people*, to the Jews under the Old C., to believers in Christ under the New; and doctrinal theology consists not a little in tracing out the nature of this relation, and the consequences which flow from it. As the people of God collectively sustain a C. relation to him, so do believers individually; and it has not been an uncommon thing for pious persons to endeavor to reduce to writing their sense of this *C. obligation* under the notion of a *personal covenanting* with God; and of binding themselves by a stronger obligation to what they believed to be good and their duty. It has also been common for men, from the earliest ages, to enter into covenants with one another with more or less of religious solemnity; and this has in particular been done among those who have suffered persecution, or have been engaged in contests concerning matters of religion, for which the authority of certain passages of the Old Testament is strongly pleaded. Instances occur in the history of the Waldenses, and of some of the Reformed churches, particularly in the history of the Reformation in Scotland. But the most memorable covenants in Scottish ecclesiastical history belong to a period subsequent to the Reformation.

COVENANTS, The, known in Scottish history and tradition, are chiefly two in number—the NATIONAL COVENANT, and the SOLEMN LEAGUE AND COVENANT. As it is necessary to discriminate between these, we shall speak of them separately.

NATIONAL COVENANT.—This was a bond of union or agreement, drawn up at Edinburgh in 1638, by the leading Presbyterian ministers, and subscribed by vast numbers of persons of all ranks of life. It embodied the Confession of Faith of 1580 and 1581, subscribed by James VI. in his youth, and again recognised in 1590 and 1596; and was binding on all who signed it to spare nothing which might save their religion. The proximate cause of this extraordinary manifestation of feeling was the attempt of Charles I. to enforce Episcopacy and the use of the Service-book in Scotland. The subscribing of the National Covenant began on the 28th of February 1638, in the Greyfriars' church and churchyard, at Edinburgh. Numerous copies were also circulated through the country for signature—a circumstance which accounts for many copies being still extant. "In the Library of the Faculty of Advocates at Edinburgh are preserved five parchment copies, with the original signatures of Rothes, Montrose, Loudon, and many others of the nobility, gentry, commissioners of counties and burghs, and ministers, though only one of these five copies is apparently connected with the first signing, and the other four, which are dated 1639, were subscribed after the ratification by the General Assembly."—"Historical Sketch Illustrative of the National Confession of Faith." (Davidson, Edinburgh, 1849), to which we refer for a variety of details. The General Assembly, which met at Glasgow, November 21, 1638, ratified the National Covenant and the Confession of Faith which it embraced, and deposed the whole of the hierarchy which had been established by Charles I. The National Covenant was subsequently ratified by the 5th act of the second parliament of Charles I., held at Edinburgh June 11, 1640, and subscribed by Charles II. at Spey, June 23, 1650, and Scoon, January 1, 1651. The document will be found in the volume which comprehends the "Westminster Confession of Faith," in use by the Church of Scotland. Those who subscribe the National Covenant, promise to "continue in obedience of the doctrine and discipline of this kirk." They also give assent to various acts of parliament in the reign of James VI., which, besides repudiating the jurisdiction of the pope, and all the ceremonial observances and errors of the Romish Church, ordain "all sayers, wilful bearers, and concealers of the mass, the maintainers and resettors of the priests, Jesuits, trafficking Papists to be punished without any exception or restriction."

SOLEMN LEAGUE AND COVENANT.—This was a document of date four to five

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years later than the National Covenant, since the signing of which, Charles I. had broken with the English parliament, set up his standard at Nottingham (August 1642), and from his various successes, it was thought he might finally be able to reinstate Episcopacy in Scotland. With some alarm on this ground, the Scotch willingly received overtures from commissioners deputed from the English parliament. Hopes were held out to the Scottish nation, that in the event of success against the king, the Presbyterian model should supersede the Episcopalian both in England and Ireland. Approving of a measure of this kind, the Scottish Estates entered into what was called a Solemn League and Covenant with the English parliament. One of the provisions of the bond of agreement was, that the Scotch should send an army into England against the king, which they did in January 1644.

The Solemn League and Covenant was subscribed by many of all ranks in Scotland and England, including the Assembly of Divines at Westminster, was ratified by the General Assembly at Edinburgh, August 17, 1643, and the Scottish parliament, July 15, 1644; and subscribed by Charles II. at Spey, 1650, and Scoon 1651. Like the National Covenant, it has, till the present day, a place in the volume which comprehends the "Westminster Confession of Faith" of the Church of Scotland. While the National Covenant refers to the observance of the Presbyterian polity within Scotland alone, the Solemn League and Covenant is much more comprehensive. Those who subscribe it, setting out with a profession of attachment to the Church of Scotland, are to endeavor to bring about a uniformity in religion and church-discipline in the three kingdoms; and further—"That we shall in like manner, without respect of persons, endeavor the extirpation of popery, prelacy (that is, church-government by archbishops, bishops, their chancellors, and commissaries, deans, deans and chapters, archdeacons, and all other ecclesiastical officers depending on that hierarchy), superstition, heresy, schism, profaneness, and whatsoever shall be found to be contrary to sound doctrine and the power of godliness, lest we partake in other men's sins, and thereby be in danger to receive of their plagues; and that the Lord may be one, and his name one, in the three kingdoms."

Such were the famous Covenants, at one time enforced by civil penalties, and for which their adherents, under the name of Covenanters, fought and suffered in Scotland, between the Restoration and Revolution, maintaining to the last that both Covenants, notwithstanding certain rescissory acts of parliament, were still binding on the whole nation. At the Revolution, the two Covenants were set aside, and cannot be said to have now any practical effect in any part of the United Kingdom. As above stated, they have a place in the volume which comprehends the "Westminster Confession of Faith," but for what reason, it is difficult to say; for the Church of Scotland does not make adherence to them obligatory on either clerical or lay members. Certain Scottish and Irish dissenters, however, still profess attachment to the Covenants, and on particular occasions renew their subscription of them. See CAMERONIANS. The obligations undertaken by the sovereign, and the modern acts of parliament abolishing religious tests on taking civil office, and admitting Roman Catholics, Nonconformists, and Jews to parliament, not to speak of public opinion, are totally at variance with the Covenants. It is customary in popular lectures on the Covenanters to overlook the fact, in compassion for their sufferings, that they contended for what is now quite adverse to the principles of religious toleration. Yet, in so far as the manful struggle in which they were concerned helped to accelerate the Revolution, the history of the Covenanters must ever be associated with that of civil and religious liberty. W. C.

CO'VENT GA'RDEN (properly *Convent Garden*, from having been originally the garden of Westminster Abbey) is a square in London celebrated for its great market of fruit, vegetables, and flowers. In the 17th c., C. G. was a very fashionable quarter of the town—the residence of many eminent persons. The scene of one of Dryden's plays is laid here, and frequent allusions are made to the place in plays of Charles II.'s time. The market, now so famous, appears to have originated about 1656 in a few wooden sheds and stalls. C. G. is for a stranger one of the sights of London, and is seen to greatest advantage about three o'clock on a summer morning: Tuesday, Thursday, and Saturday being the principal days.

CO'VENTRY (Convent Town), a city, parliamentary, and municipal borough, and manufacturing town in the north of Warwickshire, on the Sherbourne, an

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affluent of the Avon, 18¼ miles east-south-east of Birmingham. It stands on a gentle eminence in a valley, with a ridge of hill on the south, and contains many old houses, with timbered fronts projecting into narrow streets, and belonging to the 15th and 16th centuries. The modern part of C., however, is well, though not regularly built. The chief buildings are the churches, with imposing spires. St Michael's Church, built 1813—1895, is said to be the largest parish church in England, and is one of the noblest of the lighter Gothic structures. St Mary's Hall, built 1450, for the Guild, is one of the finest specimens of ornamental work in England, with grotesque carved oak roof, ancient tapestry, and great painted window. In the market place formerly stood a rich hexagonal Gothic cross, 57 feet high, erected in the 15th c., in three stories, with exquisitely finished pillers, pinnacles, and niches, with statues of English kings and saints. Before the year 1760, the cross had fallen to decay, and in 1771, the remains of it were taken down and removed. The ancient walls, three miles in circuit round C., were demolished by Charles II. Pop. (1871) of municipal borough, 37,670. C. returns two members to parliament. The chief manufactures are ribbons and watches. There are large silk-dyeing works. C. is nearly in the centre, between the four great English ports, London, Bristol, Liverpool, and Hull, and has extentensive canal communication with other parts of the country. It is a very ancient place. In 1044, Earl Leofric and his wife, Lady Godiva, founded here a magnificent Benedictine monastery. In memory of Godiva, (q. v.) who is said to have ridden round the town naked, to free it from certain imposts laid on by her husband, curious and splendid processions were formerly held in C. In the 15th c., religious mysteries or plays were often acted here by the Grey Friars before kings. Henry VIII. demolished the beautiful cathedral of C. Here occurred the famous meeting for the intended trial by battle between the Dukes of Norfolk and Hereford, immortalized in Shakspeare's "Richard II." Two memorable parliaments were also held in the monastery of C. in the 15th century. The one contained no lawyers, while the other passed many attainders against the Duke of York, &c. In the 15th, 16th, and 17th centuries, C. was famous for woollens, broadcloths, caps, and blue thread bonnets. The Lammas Land lying around C., and comprising about 1100 acres, was not long ago divided between the proprietors and the freemen, numbering about 4000, in the proportion of about two-thirds to the former, and one-third to the latter. C. was visited by the plague six times between 1350 and 1625. The phrase, "to send to Coventry," took its rise most probably from the derivation of the name C., and meant "to send to a convent;" i. e., to shut out from society.

COVENTRY, Sir John, has obtained a niche in English history from accidental circumstances. In the month of October, 1670, he rose in parliament and asked a question relative to a measure before the House, which was taken as an unwarrantable reflection on the king's amours. Charles was furious, and sent some of his guards to watch in the streets where C. lived, and leave a mark upon him. C. was attacked one night, and had his nose cut to the bone. Parliament took notice of this atrocious outrage, and passed a bill known by the name of the COVENTRY ACT, making cutting and maiming a capital offence; but they had not courage sufficient to bring the king's bravoes to trial.

COVERDALE, Miles, an eminent English divine, was born in Yorkshire in 1487. He was educated at Cambridge by the Augustin friars, and becoming an Augustin monk, was ordained at Norwich. He appears, however, to have soon changed his religious opinions, and to have devoted himself earnestly to the work of the Reformation. Being abroad in 1532, he assisted Tyndale with his translation of the Scriptures, and three years afterwards appeared his own translation of the Bible, with a dedication by himself to Henry VIII. This was the first English Bible sanctioned by royal authority, as, indeed, it was the first complete translation of the Bible printed in the English language. The Psalms of this translation are those still used in the Book of Common Prayer. In 1538, C., with the consent of King Henry VIII., and with the permission of Francis I., went to Paris to superintend another English edition of the Scriptures, his reason for going to Paris being that paper and workmanship were there cheaper and better than in England. The inquisition, however, notwithstanding the royal licence of Francis, interfered, seized the whole impression, consisting of 2500 copies, and condemned them to the

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flames. But through the cupidity of one of their executive officers, who sold a considerable number of the heretical books to a harberdasher as waste paper, some copies were saved and brought to London along with the presses, types, &c., which had been employed in printing them. Several of the workmen also came over to London; and Grafton and Whitchurch, the noted printers of that day, were thus enabled to bring out in 1539, under C.'s superintendence, the "Great Bible," commonly called "Cranmer's Bible," on account of that prelate having written a preface to it. In 1551, C. was appointed to the see of Exeter, the duties of which high ecclesiastical office he discharged with great zeal, until the accession of Mary in 1553, when he was ejected, and thrown into prison, from which he was only released after two years' confinement, on the earnest intercession of the King of Denmark, whose interest was evoked by his chaplain, C.'s brother-in-law, and on the condition that he should leave the country. C. went to Denmark, and subsequently to Geneva, where he assisted in producing the "Geneva Translation" of the Scriptures (1557—1560). On the accession of Elizabeth, he returned to England, but certain notions concerning ecclesiastical ceremonies imbibed at Geneva operated against his preferment in the church; and it was not until 1564 that he was collated to the rectory of St Magnus, London. Owing to age and infirmities, he resigned this living in 1566, and died in about two years afterwards. C. was the author of several tracts designed to promote the Reformation, and made various translations from the works of the continental reformers. The tri-centenary of the issue of his Bible was celebrated throughout the English Church, October 4, 1835, and medals were struck in honor of the occasion.

CO'VERT WAY, or Covered Way, in Fortification, is a road or broad path outside the ditch of a fortified place, between the counterscarp and the glacis. It is about 30 feet wide, and is sunk so far below the crest of the glacis, that soldiers standing upon it cannot be seen by the besiegers; hence the name of covert or hidden way. Sentinels placed in the C. W., prevent all access of the enemy's spies to examine the ditch; and when musketeers mount on the banquette or raised platform on the side next the glacis, they can pour out a grazing fire on the enemy over the crest. The C. W. is broad enough to allow bodies of troops to form on it, either to act defensively or to make sorties; and to increase this accommodation, enlarged portions, called *places of arms*, are made at certain spots.

COVILHA', a town of Portugal in the province of Beira, about 40 miles west of Coimbra, picturesquely situated among the mountains of Estrella. It has a population of 7000, chiefly engaged in the manufacture of a brown cloth, worn all over Portugal, called saragoca. There are some sulphureous baths in the neighborhood, recommended for nervous diseases.

CO'VINGTON, a city of Kentucky, U. S., on the south bank of the Ohio River, and west of the mouth of Licking River, opposite Cincinnati, with which it is connected by a lofty suspension-bridge and steam-ferries. It has a city hall, 25 churches, the Western Theological College, a Roman Catholic cathedral, and manufactories of cotton, hemp, silk, tobacco, and iron. There are also several establishments for packing pork and beef. Pop. (1860) 16,471; (1870) 24,505; (1880) 29,720.

COW. See Ox, Dairy.

COW PA'RSNIP (*Heracleum*), a genus of plants of the natural order *Umbelliferæ*, having petals bent in at the middle, and flat compressed fruit. One species only is a native of Britain, the common C. P. or Hog-weed, called *Kesh* in Scotland; a common and rank weed, with coarsely hairy leaves, and stem about 3—5 feet high. It is gathered in some parts of England for fattening hogs, and is said to afford wholesome food for cattle. Some Siberian species are much larger, and have been recommended for cultivation on account of the great quantity of herbage which they yield very early in the season, particularly *H. panaces*, which sometimes attains a height of 10 feet, and the root leaves are 3—5 feet long.

COW PLANT (*Gymnema lactiferum*), a perennial plant of the natural order *Asclepiadaceæ*, a native of Ceylon; with erect stem, ovate leaves, and very short umbels; which has acquired a factitious celebrity from the statement made and often repeated that its milky juice is used as a substitute for milk, and that its leaves are

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boiled to supply the want of cream! But this, according to Sir J. E. Tennant, is altogether a mistake, and the name is derived merely from the appearance of the juice.

COW TREE, a name given to a number of species of trees of different natural orders, the bland milky juice of which is used instead of milk. They are all natives of tropical countries, and mostly belong to natural orders in which acridity is the general characteristic of the milky juice. Some of them belong to the natural order *Moraceæ*, and are closely allied to the Fig; others to the natural order *Artocarpaceæ*, one of which is the famous PALO DE VACA or C. T. of the Cordilleras and Caraccas (*Galactodendron utile*, now rather referred to the genus *Brosimum*, see BREAD-NUT). Another is the HYAHYA (*Tabernæmontana utilis*), a native of equatorial America, belonging to the natural order *Apocynaceæ*.

The PALO DE VACA grows in rocky situations, at an elevation in equatorial regions of about 3000 feet. It is a lofty tree, with laurel-like leaves, 10—16 inches long, and very small flowers. For several months in the year, not a shower moistens its foliage and its branches appear dead; but as soon as the trunk is pierced, there flows from it a copious stream of sweet and nourishing milk. The milk flows most freely at sunrise. The natives are then to be seen hastening from all quarters with bowls to receive it. The milk has an agreeable odor and a viscidity which does not belong to the milk of animals; it becomes yellow in a short time, and thickens or forms a sort of cream at the surface, which gradually thickens into a cheesy consistency before it begins to putrefy. This milk is nutritious, and is much used by the negroes and Indians; but differs very materially in its composition from the milk of animals; more than one half being wax and fibrin; a little sugar, a salt of magnesia, and water, chiefly making up the rest.

The HYA-HYA also yields a copious milky juice, which is used in Demerara and elsewhere as a substitute for milk, and is very agreeable and nutritious.

COW'AGE, Cowhage, or Cow'itch, consists of short, slender, brittle hairs, which grow on the outside of the pods or plants of the genus *Mucuna*, natives of the tropical parts of America and Asia. This genus belongs to the natural order *Leguminosæ*, suborder *Papilionaceæ*, and has a knotted, two-valved pod divided by transverse partitions. The species are twining plants, shrubby or herbaceous, with leaves of three leaflets. That which yields most of the C. brought to Europe is *M. pruriens*, a native of the West Indies, with racemes of fine purple flowers, which have a disagreeable allinaceous smell and pods about four inches long. *M. prurita* of the East Indies, and *M. urens*, the Ox-eye Bean of the West Indies, yield C. of similar quality. The hairs readily stick in the skin, and cause intolerable itching. C. is used in medicine, acting mechanically in killing and expelling worms, particularly the species of *Ascaris* (q. v.). That it does not act on the inner surface of the intestinal canal, is supposed to be owing to the mucuous secrection. It is generally administered in syrup, treacle or honey. Before the pods of C. plants are ripe they are used as a vegetable like kidney beans, and are very palatable.

COW'BANE. See HEMLOCK.

COW'BERRY. See WHORTLEBERRY.

COW'BRIDGE, a municipal and parliamentary borough in the south of Glamorganshire, on the Ddaw, 12 miles west of Cardiff. It chiefly consists of one long and wide street. It once had walls with three gates, built in the end of the 11th century. One of the gates, a Gothic structure, still remains. Pop. (1871) 1134. With Cardiff and Llantrissant, it returns one member to parliament.

COWES, West, a seaport and watering-place in the north corner of the Isle of Wight, on the west side of the mouth of the estuary of the Medina (here a third of a mile broad). It stands on a hill slope, and has a striking aspect from the sea. There are many elegant villas in the vicinity. C. has much trade, being the port of the Isle of Wight. It has daily steam communication with Southampton, from which it lies 10½ miles to the south-south-east, and with Portsmouth, from which it lies 11 miles to the west-south-west. At the angle formed by the Medina and the sea, is a small battery built by Henry VIII. C. is the head-quarters of the Royal Yacht Squadron and Club, who hold their annual regatta here. Pop. (1871) 5780. In 1875, 4863 vessels, of 126,675 tonnage, entered the port, and 1927, of tonnage 51,551, cleared

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it.—EAST COWES is situated on the east side of the mouth of the Medina, and 2 miles north-west of Osborne House, the marine residence of Queen Victoria. Pop. (1871) 2068.

COWLEY, Abraham, was born in London in 1618. He was the son of a grocer, and was educated at Westminster School and Trinity College, Cambridge. According to his own statement, he was made a poet by the perusal of Spenser, whose works were wont to lie in his mother's parlor. A volume of poems, entitled "Poetic Blossoms," was published by him at the age of 15, and one of the pieces contained therein was written when he was 10 years old. At Cambridge he obtained distinction through the elegance of his translations; and while there, he composed the greater part of the "Davideis," an epic in four books—a work which he never completed. He was attached to the court party, and, in consequence, was ejected from his college in 1643, after he had taken his degree of M.A. In 1646, he followed the queen to Paris, in which city he remained ten years; and on his return to England, being under suspicion, he was seized and bound in heavy securities for his future behavior. In the same year, he published an edition of his poems, with a preface, in which certain passages appeared, supposed to have a political bearing, which were suppressed in subsequent editions. After the Restoration, he expected to obtain the mastership of the Savoy, but was disappointed. He subsequently obtained a lease of the queen's lands at Chertsey, in Surrey, whither he retired in 1665. He died in July 1667, in his 49th year, and was buried in Westminster Abbey, near Chaucer and Spenser. In 1675, a monument was erected to his memory by the Duke of Buckingham.

Although almost forgotten now, the time was when C.'s poetry was considered equal to Shakspeare's or Spenser's. It certainly possesses merits of ingenuity and verbal brilliancy. He is often splendid, but it is the splendor of the rocket rather than of the glowworm or the star. His prose is more natural than his verse, and some of its passages reach a stately eloquence, reminding the reader of the magnificent prose of Milton.

COWLEY, Henry Richard Wellesley, first Earl (his father being first Baron Cowley, better known as Sir Henry Wellesley), an English diplomatist of liberal opinions, was born in 1804. He early devoted himself to diplomatic pursuits. An attaché at Vienna in 1824, he was afterwards successively promoted to be secretary to the legation at Stuttgart, and to the embassy at Constantinople. Having acted as minister-plenipotentiary to Switzerland, and afterwards to Frankfort, he was (1851) appointed minister to the Germanic Confederation, and in the following year he succeeded the Marquis of Normandy as ambassador at Paris. For this position he displayed eminent qualifications, and held the appointment whether his party was in or out of office till 1867, when he resigned. Along with the Earl of Clarendon he represented Great Britain at the Paris Congress of 1856; and it was greatly owing to his tact and temper that ill-feeling between the two countries did not result in more serious disagreement. He was created Viscount Dangan and Earl Cowley in 1857, and made a K.G. in 1865.

COW-PEN BIRD (*Molothrus pecoris*), also called Cow Bird, Cow Troopial, Cow Blackbird, Cow Bunting, &c., a bird nearly allied to the Baltimore Birds and Troopials, having a short, conical beak, and remarkable for its habit of depositing its eggs, like the cuckoo, in the nests of other birds. It is a native of North America, common in some of the southern states in winter, and migrating northward in spring. Great flocks are sometimes seen together. The C. B. is about seven inches in entire length, of glossy brownish black plumage. It derives its name from its frequenting cow-pens, to feed on the insects contained in, or attracted by the dung. It selects for the reception of its eggs the nests of birds smaller than itself, and by an interesting provision of nature, its egg, which is not much larger than theirs, is hatched sooner, and theirs appear to be generally removed as addled eggs.

COWPER, William, an English poet, was born on the 26th November 1731, in the parsonage house of Great Berkhamstead. His father, who was chaplain to George II., married Ann, daughter of Roger Donne, Esq., of Ludham Hall, in Norfolk. This lady expired in childbirth in 1737, leaving two sons, William, the

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poet, and John. This event made a deep impression on C.'s mind; and the lines addressed to his mother's portrait have drawn more tears than any other poem in the English language.

C. was a delicate and sensitive child, and boyhood brought with it only deeper melancholy and depression. At the age of six he was placed at a considerable school kept by a Dr Pitman, in Market Street, Hertfordshire. The period he spent here was very miserable, and laid the foundation of that settled gloom which oppressed him till death. It is to the remembrance of these wretched days that we are indebted for the fierce invective that burns in the somewhat one-sided "Tirocinium, or a Review of Schools." C. completed his studies at Westminister School, and shortly after was articled to a Mr Chapman, an attorney in London.

After completing his three years' articles with Mr. Chapman, C. went, in 1752, to reside in the Middle Temple. In 1754 he was called to the bar, but never practiced. His father died in 1756, and left him a small patrimony. In 1759 he removed to the Inner Temple; and although at this period he expected to secure some legal appointment through the influence of his family, he hated law with a perfect hatred, and seldom opened a book that bore on his profession. Yet he was industrious enough; he scribbled poetry, read Homer, and, in conjunction with his brother, translated some of the books of the "Henriade." Soon after his settlement in the Inner Temple he was appointed a Commissioner of Bankrupts; but there is no reason to believe that he ever entered on the duties of his office. An influential relative now offered him the office of Clerk of the Journals of the House of Lords, which was accepted; but he, having to undergo an examination at the bar of the House, was seized with nervousness, and could not appear. At this period his misery was so great, that he meditated suicide, but fortunately to failed carry out his intentions for want of courage. In December, 1763, he was removed to the house of Dr Cotton at St Albans—a prey to the deepest remorse.

C.'s pecuniary means had suffered considerably by the loss of his appointments, but his friends contrived to make up an income sufficient for his wants. After his removal from St. Albans, he went to reside in the town of Huntingdon. Here he formed acquaintance with Mrs. Unwin, the Mary of his poems—an acquaintance which ripened into the deepest friendship, and which subsisted till death. He went to reside with the Unwins, and enjoyed much tranquil happiness under that religious roof. When on a visit, in January 1773, to the Rev. Mr. Newton, a friend of the Unwins, and a man of sincere piety, but, from the peculiar cast of his religious views, perhaps not the best physician "to minister to a mind diseased," his malady returned. Mrs. Unwin carefully tended him through the crisis of his delirium, and through his long and slow recovery. When convalescent, he betook himself to writing hymns along with Mr. Newton, and to domesticating hares, with the particulars and little incidents of which amusement the world is pleasantly familiar. Mrs. Unwin also suggested, as a subject suited to his genius, "The Progress of Error." C. set to work in December 1780, and by the following March had completed "Truth," "Table-Talk," "The Progress of Error," and "Expostulation." Although the volume was completed in 1781, its publication was delayed till the following year.

In 1781, C. made the acquaintance of Lady Austen, who suggested to him "The Task," urged him to translate "Homer," and—what the world is perhaps still more grateful for—she related to him the history of John Gilpin. The story so seized C.'s fancy, that in the course of a single night he produced the poem which has tickled the midriffs of three generations. "The Task" was begun in the winter of 1783, and published in 1785. Its success was great, and C. began to be considered the greatest poet of his day. In 1784 he began the translation of Homer, which appeared in 1791. It was received with great applause. He had labored hard and had now to pay the penalty. The pen was the only weapon with which he could keep his constitutional malady at bay; but now, when seated at his desk, his genius would not answer the call. He began to hear again the voices and the whisperings which had afflicted him in earlier days. Mrs. Unwin's faculties also became affected, and the two friends were groping in the same twilight, deepening for both into the darkness of death. They left Olney, and were received into the house of Mr. Johnson, in Tuddenham, in Norfolk. Here Mrs Unwin died on the 17th December 1796. C. now

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fell into a state of utter dejection; in 1799 he was attacked by dropsy. He died on the 27th April 1800.

C. was a great innovator in English literature; he destroyed the sentimentalists led by Hayley, and the image-hunters headed by Darwin. His poetry is eminently healthy, natural, and unaffected. C. and Robert Burns we have to thank for bringing back nature to English poetry. Besides being a poet, C. was perhaps the most delightful letter-writer in the English language. Nothing can surpass the charm of his epistles—full of fun, gentle sarcasm, anecdote, acute remark, and a tender shadow of melancholy thrown over and toning down the whole. The best edition of C.'s works (accompanied by an admirable biography) is that of Southey, 15 vols. 12mo., Lond. 1837—1838.

COWRY (*Cyprœa*), a genus of gasteropodous molluscs of the order *Pectinibranchiata*—the type of a family, *Cyprœidæ*, to all of which the name C. is often extended—having the margin of the mantle prolonged into a siphon, by which water is conveyed into the gill chamber, and a spiral convoluted shell, the spire visible in the young, but entirely concealed in the adult, and the outer lip then thickened and bent in. The aperture extends the whole length of the shell. The shells, called *Porcelain Shells* by the French and Germans, are almost entirely calcareous in their composition, are richly enamelled, and often very beautiful. They are most abundant, and attain their largest size in the seas of warm climates. Only a few very small species are found on the British coasts. Some of the species are much prized by collectors of shells. The Money C. (*C. moneta*) is of commercial interest, from its general use as a substitute for coin in many parts of Asia and Africa. It is not of great beauty, is yellow or white, often with a yellow ring, about an inch long, and nearly as broad as long. It is found on the Indian coasts, and in particular abundance on those of the Maldive Islands, and is one of their principal exports. In Bengal, 3200 cowries are reckoned equal to a rupee, so that a C. is about equal in value to one thirty-sixth of a farthing. Yet cowries to the value of 200,000 rupees are said to have been at one time imported annually into Bengal. Many tons of cowries are annually imported into Britain, to be used in trade with the west of Africa, and this importation began when it was in the slave-trade that they were employed.—To the family *Cyprœidæ* belong the shells called *Poached Eggs* (*Ovulum*), the *Weaver's Shuttle Shell* (*Ovulum volva*), remarkable for its prolongation at both ends, &c. Fossils of this family are numerous in some strata, as in the *Bagshot Beds* (q. v.).

COWSLIP (*Primula veris*; see PRIMROSE), a common native of pastures in England and many other parts of Europe, although rare in Scotland, a delicate and modest little flower, a universal favorite, both for its beauty and its fragrance. The flowers are small, in an umbel at the top of the scape, the limb of the corolla short and concave. The flowers have sedative properties, and are sometimes used as an anodyne and anti-spasmodic. They are fermented with sugar to make *cowslip wine*, an agreeable and favorite soporific domestic medicine.—The name VIRGINIAN COWSLIP is given to the *Dodecatheon Meadia*, a perennial plant, also of the natural order *Primulaceæ*, a native of North America, with a stalk about 8 inches high, bearing an umbel of gracefully pendent lilac flowers, the petals reflexed over the calyx, the stamens and pistil long, and the anthers of a golden color. It is very ornamental in the flower-border, flowering in the end of April or beginning of May.

COW-WHEAT (*Melampyrum*), a genus of plants of the natural order *Scrophulariaceæ*, having an oblong two-celled capsule, with a few seeds somewhat resembling grains of wheat. The species are natives of the temperate parts of the northern hemisphere, annual plants with opposite narrow leaves and yellow flowers, growing in woods, cornfields, pastures, &c. Several are natives of England. They are said to be very fattening to cattle, and to give a yellow tinge and peculiar excellence to butter made from pastures in which they abound.

COXE, William, a very industrious historical writer, was born in London, March 1747, and was educated at Cambridge. As tutor to the sons of several noblemen, he, at various times, spent many years on the continent, where he neglected no opportunity of collecting information about the countries which he visited. The result appeared in many volumes of travels and history, all of which are characterised by close observation, care, and research; but the writing in general is far from sprightly.

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Among the best known of C.'s works is his "History of the House of Austria," which is still a standard work. C. also wrote "History of the Kings of Spain of the House of Bourbon," "Memoirs of the Duke of Marlborough," "Memoirs of Sir Robert Walpole." and "Memoirs of the Pelham Administration," besides many contributions to our knowledge of the topography and social condition of several continental countries. C., who commenced his clerical life in 1771 as a curate at Denham, near Uxbridge, ended it as Archdeacon of Wilts, which appointment he obtained in 1805. He died June 1828. Several of his works have been published in Bohn's "Standard Library."

COXI'M, one of the head waters of La Plata, rises in Matto Grosso, a frontier province of Brazil, towards Bolivia and Peru. After flowing first to the north-east, and then to the north-west, it enters the Taquari, itself a tributary of the Paraguay, in lat. 18° 24's. The C. receives many affluents.

COY'PU (*Myopotamus Coypu*), a rodent quadruped nearly allied to the beaver, with which it agrees in the number and character of its teeth, in its short limbs, in its feet having five toes each, the hinder feet webbed and the fore feet not webbed, and to a considerable extent in its habits; but from which it differs in the form of its skull, having a more elongated muzzle and a contracted palate, and in its slender tail resembling that of a mouse. It is the only known species of its genus, and inhabits great part of South America, on both sides of the Andes, burrowing in the banks of the rivers, and sometimes in forests near the sea-beach. It is very nearly equal in size to the beaver, has small ears, very long and stiff whiskers, and long hair mixed with dense and soft short hair, the upper parts beautifully pencilled with different shades of yellow, the sides and under parts lighter and more uniform in color. The fur has become an important article of commerce, under the names of RACOONDA (q. v.) and NUTRIA, the latter name signifying in Spanish an otter, having apparently been given to it by mistake, but being that chiefly used in Britain.

CRAB, Roger, a singular sectary of the English Revolution, had served for seven years in the Parliamentary army, and though he had his "skull cloven" by a royalist trooper, yet, for some breach of discipline, Cromwell sentenced him to death, a punishment, subsequently commuted to two years' imprisonment. After his release from jail, C. set up in business as a "haberdasher of hats" at Chesham, in Buckinghamshire. His wandering mind, probably not improved by the skull-cleaving operation, then imbibed the idea, that it was sinful to eat any kind of animal food, or to drink anything stronger than water. Determined to follow, literally, the injunctions given to the young man in the gospel, he sold off his stock in trade, distributing the proceeds among the poor, and took up his residence in a hut, situated on a rood of ground near Ickenham, where for some time he lived on the small sum of three farthings a week. His food consisted of bran, dock-leaves, mallows, and grass; and how it agreed with him we learn from a rare pamphlet, principally written by himself, entitled "The English Hermit, or the Wonder of the Age." "Instead of strong drinks and wines," says the eccentric Roger, "I give the old man a cup of water; and instead of roast mutton and rabbit, and other dainty dishes, I give him broth thickened with bran, and pudding made with bran and turnip-leaves chopped together, at which the old man (meaning my body) being moved, would know what he had done, that I used him so hardly. Then I shewed him his transgressions, and so the wars began. The law of the old man in my fleshly members rebelled against the law of my mind, and had a shrewd skirmish; but the mind being well enlightened, held it so that the old man grew sick and weak with the flux, like to fall to the dust. But the wonderful love of God, well pleased with the battle, raised him up again, and filled him full of love, peace, and content of mind, and he is now become more humble, for now he will eat dock-leaves, mallows, or grass."

The persecutions the poor man inflicted on himself caused him to be persecuted by others. Though he states that he was neither a Quaker, a Shaker, nor a Ranter, he was cudgeled and put in the stocks; the wretched sackcloth frock he wore was torn from his back, and he was mercilessly whipped. He was four times arrested on suspicion of being a wizard, and he was sent from prison to prison; yet still he would persist in his course of life, not hesitating to term all those whose opinion differed from his by the most opprobious names. He published another pamphlet

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entitled "Dagon's Downfall, or the great Idol digged up Root and Branch; the English Hermit's Spade at the Ground and Root of Idolatry." This work shews that the man was simply insane. We last hear of him residing Bethnal Green. He died on the 11th of September, 1680, and was buried in Stepney Churchyard.—"Chambers's Book of Days," vol. ii. p. 834.

CRAB, the popular name of all the crustaceans of the order *Decapoda* (the highest order of crustaceans, characterised by great concentration of the nervous system and corresponding general concentration, by five pair of thoracic limbs, and by having the gills inclosed in a special cavity on each side of the thorax, covered by the carapace) and sub-order *Brachyoura* (characterized by the small size of the abdomen, which resembles a short tail curved under the thorax and appressed to it, all the most important viscera being included in the thorax), and extended also to some of the sub-order *Anomoura* (Purse-crabs, Hermit-crabs, &c., characterised by a condition of abdomen intermediate between that of the *Brachyoura* and that of the *Macroura*, or Long-tailed Decapod Crustaceans, such as the Lobster, Cray-fish, &c.). All the crabs, besides many other crustaceans, were comprehended in the Linnæan genus *Cancer;* but the number of species is very great, and the *Brachyoura* alone are now arranged into many genera and even families. The different kinds of crabs differ very much in the form of the carapace (the back), which in some is orbicular or nearly so; in some, much broader than it is long; in others, longer than broad; in some, prolonged in front into a kind of beak, &c.; also in its smoothness, or roughness with hairs, tubercles, or spines; in the length of the legs, &c. The eyes are compound, with hexagonal facets, and are elevated on stalks, which are generally short, but sometimes considerably lengthened, and which have the power of motion, so as to turn the eye in different directions. The first pair of limbs are not used for locomotion, but exhibit in great perfection the characteristic claws or pincers (*chelæ*) of the decapod crustaceans. Crabs are inhabitants of almost all seas; most of them, however, having their limbs formed for walking rather than for swimming, are found chiefly near the coast; some inhabiting comparatively deep water, and others abounding in those parts which are left by the receding tide, where they occur equally in the rock pools and among the moist sea-weeds. Some small kinds of crabs (*Pea Crabs*) are often found in the inside of mussels and other bivalve molluscs. Some crabs inhabit fresh water, particularly in the warmer parts of the world; and others, known as Land crabs (q.v.), live among moist herbage, or burrow in sand or earth. Some have the last pair of limbs expanded at the extremity into a broad blade for swimming, and some have even all the four pair of limbs intended for locomotion thus expanded, and sometimes occur far out at sea. Some of the crabs, with very long legs, are known as Spidercrabs. Crabs moult or change their shell, not at fixed intervals or seasons, but according to the exigencies of their growth; the change being made with great frequency when they are very young, but rarely in advanced age: indeed, from the molluscs, and other animals sometimes found adhering to the carapace, it is inferred that the same covering is sometimes worn for a number of years.—The metamorphosis of crabs is noticed in the article CRUSTACEANS.—Crabs are interesting inmates of the aquarium, from their readiness in seizing food, their activity in tearing and eating it, their general habits, and, in particular, their pugnacity. The number of specimens is apt, however, to be soon diminished by the stronger killing and eating the weaker.—Many kinds of crabs are used as articles of food in different parts of the world, as the Large Edible C. (*Cancer Pagurus*) and small Edible C. (*Carcinus Mœnas*) of the British shores. The latter is extremely common on all parts of the coast, but is not nearly so much esteemed as the former, which is much sought after, and is caught either in the holes of the rocks at low tide, or by means of a kind of trap, a basket which readily permits its entrance but not its escape, and which is baited with meat or animal garbage of some kind. In winter it seems to retire to deeper water. Its black claws and very broad carapace, arched at the sides, readily distinguish it from all other British species. It is sometimes nearly a foot in breadth. The claws of the Edible C. were formerly ground to powder and used as a medicine, having, however, no properties but those of carbonate of lime.

CRABBE, George, a late English popular poet, was born at Aldborough, in Suf-

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folk, on the 24th December, 1754. His father was a warehouse keeper, and collector of the salt-duties at Adblorough. and exerted himself to secure for his son a superior education. C. early exhibited a passion for all kinds of book-learning, with a decided bias towards poetry. After being tolerably grounded at school in mathematics and classics, he was, in his 14th year, apprenticed to a surgeon at Wickham Brook, near Bury St Edmunds; but he had no liking for the profession, and ultimately proceeded to London, where he arrived in 1780, with £3 in his pocket, to make a trial of literature. For a while he was very unfortunate. At last, when threatened with arrest for debt, he resolved to make his case known to Burke. He told Mr Lockhart, years after, "the night after I delivered the letter at the door, I was in such a state of agitation that I walked Westminster Bridge backwards and forwards until daylight." The great orator at once appointed an interview, looked over C.'s poetical compositions, suggested several alterations, which were adopted, and finally took "The Library" and "The Village" to Mr Dodsley, by whom the first-named poem was published in 1781. C. went to reside at Beaconsfield with his generous and brilliant acquaintance, and while there met Fox, Sir Joshua Reynolds, and Lord Thurlow; the last of these invited the new celebrity to breakfast, and presented him with a bank-note for £100 at parting.

By the advice of Burke, C. entered into holy orders, and was ordained curate of his native place in 1782. Shortly after, he was appointed domestic chaplain to the Duke of Rutland, and took up his residence at Belvoir Castle. "The Village" appeared in 1783, and established the reputation of its author. Shortly after, Lord Thurlow presented him with two small livings in Dorsetshire; and now, finding himself above all fear of want, he married Miss Sarah Elmy, and entered into the enjoyment of the purest domestic happiness. In 1785, he left the castle, and took up his residence in the parsonage of Stratheru; thereafter for many years he botanised, studied geology, wrote poems, saw—in hurried visits to London—the distinguished men of his time, and was courted by them, enjoying an uninterrupted course of happiness and honor.

"The Newspaper" appeared in 1785; in 1807, C. published "The Parish Register;" in 1810, "The Borough;" two years after, he produced his "Tales in Verse;" and in 1819, he gave to the world his "Tales of the Hall." In 1813 his wife died, and shortly after he procured the living of Trowbridge, where for the remainder of his life he resided. In the autumn of 1822, he visited Edinburgh, and was the guest of Sir Walter Scott. His health began to fail in 1828; he died on the 3d of February 1832, aged 78.

C. disdained all the luxuries of his art. He has no heroes with a Hyperion front, and no heroines radiant as Aurora. He worked with the delf, not with the porcelain of human clay. He concerns himself with wild smugglers, denizens of villages by the sea, full of ancient and fish-like smells; gypsies on the heath, cooking the fowl purloined from the neighboring barnyard, with tramps, vagabonds, and vagrants, and the inmates of the workhouse. On his page these unsavory individuals live, caroune, curse, brawl, and die. He has pages stern as anything in "The Inferno;" many, droll as Hogarth's pictures; and one or two so sweet, and tender, and pathetic, that no man possessed of any sensibility can read them unmoved.

CRABETH, Dirk and Wouter, the last surnamed the Elder, were two brothers, glasspainters, born (it is supposed) at Gouda in South Holland, and who flourished in the latter half of the 16th century. It seems Dirk visited France in his youth, whilst Wouter journeyed to Italy, where he studied the works of Raphael, as is evident from his productions. Wouter, it is said, surpassed his brother in drawing, grace and clearness, while Dirk surpassed him again in coloring. They, however, were jealous of each other, and each concealed from the other the secrets of his processes. Their conjoint work in the church of St John at Gouda, is the masterpiece of the two brothers. Of the eleven painted windows in that church, seven are by Dirk, and four by Wouter. They were done between 1555 and 1571. Dirk died, it is believed, in 1601. It is unknown when Wouter died. The brothers were buried in the sanctuary they had so surpassingly illustrated.

CRACKED HEELS. From careless grooming, washing horses' legs and imperfectly drying them, permitting them to stand in accumulations of filth or exposed to draughts, the skin becomes inflamed, tender, itchy, thickened, and by and by

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cracked. An ichorous noisome discharge exudes, and lameness often results. In animals with round *gummy* legs, it is sometimes constitutional; underbred horses with rough hairy fetlocks present the majority of cases; white heels, being more delicate, are especially affected; whilst the hind limbs, exposed as they are to filth and cold, suffer most frequently. Cleanse carefully with tepid water; wash with a diluted solution of Goulard's Extract, or any other mild astringent; or dress occasionally with oxide of zinc ointment. Give, besides, a half-dose of physic, and a few mashes, carrots, swedes, or such laxative food, and where persistent, use diuretics (q.v.). When dry and irritable, poultice and apply glycerine before proceeding with astringents. In cold weather, and especially when the horse is heated, interdict washing the legs, except with tepid water, and enjoin careful drying.

CRA'CKLIN, a kind of chinaware, the glazing of which is purposely cracked in the kiln, as an ornament.

CRACOVIENNE (*krakowiak*), the national dance of the Polish peasantry around Cracow. It has a rather melancholy than lively melody in $\frac{2}{4}$ time, and is accompanied by singing. The pair who lead off the dance often begin with only the music of their own voices, and are soon followed by others, and the charm of the dance consists much in the diverting movements by which they seem to chase and avoid each other. The Poles have a multitude of little ditties of two lines each, adapted to this music and dance, which generally contain some allusion to natural phenomena, accompanied with some slight pleasantry.

CRA'COW (Pol. *Krakov*), formerly the capital of a small Polish republic, and anciently the capital of the kingdom of Poland, is now an Austrian city, situated on the left bank of the Vistula, where it becomes a navigable river, in a beautiful plain surrounded by an amphitheatre of gentle hills. Lat. 50° 4′ n., long. 19° 52′ e. Pop. (1869) 49,834, of whom 14,000 are Jews. It contains 46 churches, 15 monasteries, 10 nunneries, and 7 Jewish synagogues. The ancient city of C. is a labyrinth of narrow, dark, and deserted streets, but contains many fine specimens of Gothic architecture in its churches and other edifices; and some handsome buildings are also to be seen in the more modern suburbs. The old walls have been converted into a promenade. In the midst of the houses rises the castle, a huge building of an imposing appearance. The cathedral contains the tombs of many of the Polish kings, and of some of the greatest men of the Polish nation. The university was founded in 1364, by Casimir the Great, whose design was carried into effect by Jagello and Hedwig in 1401. It was long the centre of light for Poland, but decayed under the influences of the Jesuits, till it ceased to exist. It was reorganised and reopened in 1817, and underwent important changes in 1833. It possesses a museum of natural history, a botanic garden, a library of more than 140,000 volumes, and many MSS. of great value in connection with Polish history. Its manufactures are trifling, and its trade, at one time extensive, became, for a period, very limited, but has of late years greatly revived, owing to the extension of its railway communications, which connect it with Vienna, Berlin, Warsaw, and Lemberg. Three miles west of the city is a vast tumulus to the memory of Kosciusko. It is composed of earth taken from all the patriotic battle-fields of Poland.

C. was founded by Krak, Prince of Poland, from whom it derives its name, about the year 700, became the capital of Poland in 1320, and continued to be so till 1609, when that honor was transferred to Warsaw by Sigismund III. It was taken by the Bohemians in 1039, by the Mongols in 1241, by the Swedes in 1655 and 1702, and by the Russians in 1768. On the third partition of Poland, in 1795, it was assigned to Austria. From 1809 to 1815 it formed part of the Duchy of Warsaw. The congress of Vienna established it as a Republic, with a small territory containing about 140,000 inhabitants, under the protectorate of Russia, Prussia, and Austria. The territory bordered with that of each of these great powers. Internal dissensions between the nobles and the common people afforded a pretence for interference, and the sympathy shewn by the inhabitants of C. for the cause of Polish independence in 1830 and following years was made the ground of proceedings, which terminated in 1846 in the annexation of C. to the Austria dominions, a measure alleged to be necessary for the security of the neighboring states, but

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against which Britain and France protested. C. now forms part of the Austrian crown-land of Galicia. An extensive line of fortifications has been constructed around it by the Austrians, with numerous detached forts, and one immense fortress on a height commanding the city, whose outworks extend over a space of about five miles. These works are intended as a barrier against the advance of Russia.

CRAFT is a general designation for lighters, hoys, barges, &c., employed in loading or unloading large ships. In the royal navy, the name *small C.* is sometimes given to vessels commanded by lieutenants, such as cutters, schooners, gun-boats, &c. Also a term applied by seamen to any vessel whatever.

CRAG, a local term given specially to those masses of shelly sand which have been used from very ancient times in agriculture to fertilise soils deficient in calcareous matter. Geologists have used it to characterise several groups of strata. See NORWICH or MAMMALIFEROUS CRAG, and RED CRAG.

CRAIG AND TAIL, a term used to designate a peculiar hill conformation, in which a bold and precipitous front exists on one aspect of a hill, while the opposite is formed of a sloping declivity. Those who first observed this form of the surface, believed it was the effect of currents of water moving in the direction indicated by the C. and T.; but latterly there have been speculations calling in the aid of ice, though not excluding the presence of water also. Fine examples of this structure occur in and around Edinburgh, where the western current has left the bold "Craig" facing the west and the "Tail" sloping towards the east; as, for example, the Castle rock, precipitous and unapproachable on every side except to the east, where it has protected the shale and sandstone beds from erosion. The direction and progress of the current can easily be traced; rushing against the hard basalt of the Castle rock, it was turned aside, and continued its course eastward, hollowing out the Nor' Loch on the one side and the Cowgate valley on the other, until the influence of the rock being lost, and aided by the resistance of the Calton Hill and Salisbury Craigs, the currents again meet in the valley at Holyrood, when the "tail" entirely disappears.

CRAIG, John, an eminent preacher of the Reformation, was born in Scotland about 1512. Having spent some time is a tutor in England, he returned to Scotland and entered the Dominican order, of which he had not long been a member when he fell under the suspicion of heresy, and was cast into prison. On his release, he travelled on the continent; and after some time was, through Cardinal Pole's influence, intrusted with the education of the novices in connection with the Dominican order at Bologna. While here, Calvin's "Institutes" fell in his way, and converted him to Protestant doctrines. Having openly avowed the change in his opinions, he was brought before the Inquisition, and sentenced to be burnt—a fate from which he was saved by the mob, on the death of Pope Paul IV., breaking open the prisons in Rome, and setting the prisoners at liberty. C. escaped to Vienna, and obtained some favor at the court of Maximilian II.; but the news of his being there reached Rome, and the Pope demanded his surrender as one condemned for heresy. The emperor, however, instead of complying with the request of his holiness, gave C. a safe conduct out of Germany. He now returned to Scotland, and was appointed the colleague of John Knox in the parish church of Edinburgh. Thinking the marriage of Queen Mary and Bothwell contrary to the word of God, he, while holding this position, boldly refused to proclaim the banns. In 1572, C. was sent "to illuminate the dark places" in Forfarshire and Aberdeenshire, and remained in the north until 1579, when he was appointed minister to King James VI. in Edinburgh. He now took a leading part in the affairs of the church, was the compiler of part of the Second Book of Discipline, and the writer of the National Covenant signed in 1580 by the King and his household. He was a man of great conscientiousness, and was not slow to oppose the proceedings of the court when he deemed them opposed to Scripture, and to speak wholesome but unpleasant truths to his majesty himself. He died December 1600.

CRAIG, Thomas, author of the well-known "Treatise on the Feudal Law," was born probably about 1538. What part of Scotland he was born in is not known. Educated first at St Andrews, he afterwards prosecuted his studies at Paris, and passed as an advocate at the Scottish bar in February 1563, and in that or the follow-

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ing year was appointed justice-depute to Archibald Earl of Argyle, hereditary justice-general of Scotland. In literary pursuits, C. had distinguished himself above all his contemporaries, and while at the head of the criminal judicature of Scotland he did not neglect the *belles-lettres*, as was evidenced by an epithalamium on the queen's marriage with Darnley, and by a poem on the birth of James I. Besides his work on "Feudal Law," C. wrote on the "Succession to the Throne of England," in which he took a warm interest; a treatise on the union of Scotland and England, and one on "Homage," vindicating Scotland from the charge of feudal dependence on England, which had been asserted by Hollinshed in his "Chronicles," together with many poetical pieces. In the latter part of his life, C. acted as advocate for the Church of Scotland. He seems to have been high in favor with James VI., who wished to confer the honor of knighthood upon him; and when C. steadily refused, ordered that all persons should address him as if he really had accepted the honor. He died February 1608.

CRAIGLEITH STONE, a siliceous sandstone belonging to the carboniferous series, quarried at Craigleith, near Edinburgh, and largely used for building in that city, for which it is admirably adapted by its purity, durability, and the ease with which it can be wrought.

CRAIK, George Lillie, was by birth a Scotchman. Born in Fifeshire in 1799, he was educated for the church at St Andrews University, but, preferring a literary career, he went to London in 1824. His first work of importance was the "Pursuit of Knowledge under Difficulties" (1831), forming part of the series of publications issued by the Society for the Diffusion of Useful Knowledge. He also contributed largely to the "Penny Cyclopædia." In 1839, C. became editor of the "Pictorial History of England," some of the most valuable chapters of which were written by himself, and have since been enlarged and republished separately as independent works. Such are his "Sketches of the History of Literature and Learning in England from the Norman Conquest to the present Time" (6 vols., 1844), and his "History of British Commerce from the Earliest Times" (3 vols., 1844); and in the same year, "Bacon, his Writings and Philosophy." In 1849, C. was appointed to the chair of History and English Literature in Queen's College, Belfast, a situation which he occupied till he died in 1866. C. possessed an energetic mind, his thinking was clear, his style accurate, and he was conscientious in his statement of facts. Many of his slighter works contained suggestions in politics and social science which were both valuable and original, some of which were afterwards appropriated by, or ascribed to, others. In the first class we may mention the idea of mutual citizenship; and in the second, that of the representation of minorities, which unquestionably originated with him. Between 1849—1852 appeared his "Romance of the Peerage;" in 1855, his "Outlines of the History of the English Language," which has passed through various editions; and in 1857, his essays on "The English of Shakspeare," successive editions of which appeared in 1859, 1866, and 1867.

CRAIL, a royal and parliamentary borough and sea-port in the "East Neuk" of Fifeshire, 2 miles south-west of Fifeness, and 10 miles south-east of St Andrews. Pop. (1871) 1196. Along with St Andrews, East and West Anstruther, Cupar, Kilrenny, and Pitenweem, it returns one member to parliament. C. was a town of some note in the middle ages, being then called Caryll. In 847 there was a skirmish with the Danes here, and at Fifeness there are still the traces of what is believed to have been a Danish encampment. There are traces of an old castle, in which David I. occasionally resided; of a priory college, and other adjuncts of an ecclesiastical establishment. The Established Church, though it has undergone many alterations, is still substantially the ancient structure, and the square tower, with the broach (q. v.) which springs from it, are in their original condition, and very perfect in form. It was after a sermon preached in this church by Knox in 1559, that his hearers rushed in an infuriated mob to St. Andrews, and burnt the magnificent cathedral of the Episcopal metropolis. Archbishop Sharp was for some time minister of Crail. The harbor of C., though small, is safe; but there is a much more commodious site for a harbor in what is called Room Bay, in the immediate neighborhood, the desirableness of converting which into a harbor of refuge has often been urged on government. Could this improvement be effected, it is believed that C. would again become, as it was formerly, the great rendezvous for the herring-fishery. Even

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without this advantage, there has been a great revival in this branch of trade of late years, and fish is now cured to the value of £20,000 to £30,000 annually in the little fishing towns in this neighborhood. Being a retired spot, with many traces of the well-being and good taste of earlier times still clinging to it, C. is eminently suited for a summer residence for sea-bathing purposes. Its bold coast offers pleasant rambles, and interesting excursions to the geologist and botanist. The town is lighted with gas, possesses good shops and markets, a reading-room, lecture institute, &c.

CRAKE (*Crex*), a genus of birds of the rail family (*Rallidæ*), differing from the true rails in having the bill shorter than the head and comparatively thick. The wings are also armed with a small concealed spine. The name is derived from the harsh call-note of the male. The best-known species is the common CORN-CRAKE or LAND-RAIL (*C. pratensis*), the frequent call-note of which is heard from every field of corn or rye-grass in valleys and low grounds in the early part of summer, and is associated by almost every inhabitant of Britain with all that is pleasant in that pleasant season. The corn-crake is a very pretty bird, of a reddish-brown color, marked with dark-brown in streaks along the middle of the feathers, lighter below; it has rather long legs and long toes; the tail is very short and pointed. It runs very swiftly, so as to be able sometimes to escape from a dog; but flies rather heavily, although it is a bird of passage, and is seen in Britain only in summer. It visits, in like manner, all the northern parts of Europe, and extends its migrations even to Iceland, spending the winter on the shores of the Mediterranean and in Africa. Its call-note may be so exactly imitated by passing the edge of the thumb-nail briskly along the points of the teeth of a small comb, that it can thus be decoyed within a short distance, although it is a very shy bird, and multitudes are familiar with its cry who never saw it in their lives. Its weight is ordinarily about six ounces. It is very highly esteemed for the table; and, according to Drayton, "seldom comes but upon rich men's spits." Two or three other species, very rare in Britain, but more common in the southern parts of Europe, are chiefly found in marshy grounds, and sometimes receive the name SORA (*Zapornia*). With them is ranked the CAROLINA RAIL or SORA RAIL (*C. Carolinus*) of North America, which spends its winters in the States near the Gulf of Mexico, but migrates northward in summer, and is sometimes seen in vast numbers about marshes and the reedy margins of lakes and rivers, particularly in its migration southward in autumn. Its size is about equal to that of the corn-crake; and its color is very similar, but with mingled short streaks of white. It is much esteemed for the table.

CRAMBÉ, a genus of plants of the natural order *Cruciferæ*; having a pouch (*silicle*) of two unequal joints, of which the upper is globose and one-seeded, the lower abortive. The cotyledons (q. v.) are conduplicate. The species, which are not very numerous, are scattered over the world. One is a native of Britain, *C. maritima*, the well-known SEA-KALE (q. v). Another, *C. Tartarica*, with much divided leaves and a great fleshy root, a native of Hungary and other central parts of Europe and of Asia, is sometimes called Tartar Bread; and its root is eaten in the countries of which it is a native, either boiled, or more generally peeled and sliced with oil, vinegar, and salt.

CRAMP, an irregular, involuntary, and painful contraction of a voluntary muscle, without insensibility or other disturbance of the general system. C. is often the effect of cold, and has proved fatal to swimmers by attacking them suddenly when in the water. Otherwise it is a disease of little importance, and readily removed by warmth and friction, with regulated movement of the muscles affected. Cramps are a distressing symptom in cholera (q. v.), in which disease it has been proposed to treat them by applying a tight bandage or tourniquet (q. v.) to the affected limbs. See SPASM.

CRAMP RINGS, were rings which were supposed to cure cramp and the "falling-sickness." They are said to have originated as far back as the middle of the 11th c., in a ring presented by a pilgrim to Edward the Confessor, which, after that ruler's death, was preserved as a relic in Westminster Abbey, and was applied for the cure of epilepsy and cramp. Hence appears to have arisen the belief that rings blessed by English sovereigns were efficacious in such cases; and the custom of

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blessing for distribution large numbers of C. R. on Good Friday continued to exist down to the time of Queen Mary. The accomplished Lord Berners, ambassador to Spain in Henry VIII.'s time, writes from Saragossa to Cardinal Wolsey: "If your grace remember me with some crampe rynge ye shall doo a thing muche looked for; and I trust to bestow thaym well with Goddes grace." The metal the rings were composed of was what formed the king's offering to the cross on Good Friday, usually either gold or silver. The superstitious belief in the curative property of C. R. made out of certain pieces of silver obtained in particular ways, still lingers in some of the less enlightened English counties.

CRANACH, Lucas, a celebrated German painter, was born in the bishopric of Bamberg in the year 1472. Little is known of his early life, except that he was instructed in art by his father—that he visited Palestine in 1493 with the Elector Frederick the Wise of Saxony, who made him his court painter in 1504, at which period we find him in high reputation, especially noted for his facility. In 1508, the elector made him a grant of armorial bearings, having for crest a winged serpent. He made a journey into the Netherlands in 1509, and there drew a picture of Charles V. —the future emperor—then nine years old. C. seems to have acted as *factotum* at the court of the elector and his two successors, preparing for and directing the ceremonies and festivities, and knew besides how to follow other lucrative trades. In 1520 he bought an apothecary's business at Wittenberg, where he was also a bookseller and paper-maker, became councillor and chamberlain, and was twice chosen burgomaster of the town.

C. was closely bound up with the early reformers. He was the intimate friend of Luther, whose picture he several times painted. In 1550 he went to Augsburgh to share the imprisonment of the elector, and returned with him to Saxony in 1552. C. died at Weimar, on the 16th October 1553, in the 81st year of his age, and was buried in the court church there. He had two sons, one of whom, Lucas, was known by the name of "the younger Cranach," an excellent colorist and portrait-painter.

C. has left behind him an unusually large number of authentic pictures—indeed, he painted beyond his powers. He excelled in portraits, in painting animals, in fabulous and droll pieces, and was an excellent colorist; but failed in form, grace, and unity, and in the higher walks of art. His last and greatest work is an altar-piece in the church of Weimar—a mystical representation of the crucifixion. His peculiar humor is best seen in such pictures as his "Samson and Delilah" and his sylvan scene containing "Apollo and Diana."

CRA'NBERRY (*Oxycoccus*), a genus of small evergreen shrubs of the natural order *Vaccineæ*, distinguished from the genus Vaccinium (see WHORTLEBERRY) by the wheel-shaped corolla, with segments rolled back and the filaments leaning to the pistil. The species are few, natives of the colder regions of the northern hemisphere. The fruit is acid, and is in great request for making tarts. The only British species is the Common C. (*O. palustris*, formerly *Vaccinium Oxycoccos*), a native also of the northern parts of Europe, Asia, and America. It grows in peaty bogs and marshy grounds, and is a small wiry shrub with creeping thread-like branches, and small oval leaves rolled back at the edges. The blossoms are small but beautiful, of a deep flesh color. Large quantities of fruit are collected in some places in the north of England, and in other countries, although the draining of bogs has now made it scarce where it was once plentiful. In Germany it is collected by means of a wooden comb, and preserved with sugar. In England cranberries are often preserved in bottles closely corked or filled with pure water, in which they may be kept for a long time. They are an excellent addition to sea stores. Wine is made from them in Siberia, and a beverage made from them is sold in the streets of St. Petersburg.—The AMERICAN C. (*O. macrocarpa*) is a much larger and more upright plant, with leaves much larger and less rolled back at the margin. The berries are also larger and of a brighter red. It is a native of North America, frequent in Canada, and as far south as Virginia, growing in bogs and particularly in elevated situations and where the soil is sandy. The berries are collected by means of a rake. Large quantities of them are exported to Europe.

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